
ENVIRONMENTAL ASSESSMENT of the INTEGRATED PEST MANAGEMENT PLAN for FORT MONROE, VIRGINIA



FINAL
January 2005

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Submitted to:
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EXECUTIVE SUMMARY

This Environmental Assessment (EA) addresses the potential impacts associated with the implementation of an Integrated Pest Management Plan (IPMP), which includes the aerial application of chemical pesticides for the control of mosquitoes at Fort Monroe and the Big Bethel Reservoir and *Phragmites australis* ("phragmites") at Fort Monroe. This EA was prepared, at the request of Fort Monroe's Directorate of Public Works and Logistics Environmental Division, in accordance with the National Environmental Policy Act of 1969, as amended; regulations established by the Council on Environmental Quality, Title 40 Code of Federal Regulations (CFR), Part 1500-1508; Department of Defense (DoD) Directive 4150.7, DoD Pest Management Program; and 32 CFR Part 651, *Environmental Analysis of Army Actions*. The U.S. Army is required to identify and evaluate the impacts to the human environment as a result of the implementation of the Proposed Action and alternatives.

The Proposed Action entails implementation of the IPMP, required by Army Regulation 200-5, *Pest Management*, which is designed to reduce reliance upon pesticides, to enhance environmental protection, to maximize the use of integrated pest management techniques, and to manage and coordinate pest control efforts. The Fort Monroe IPMP includes prevention, treatment, and management techniques for controlling the following pests:

- disease vector and public health pests (e.g., mosquitoes)
- quarantine pests
- structural pests
- stored product pests
- ornamental plant and turf pests and diseases
- undesirable vegetation (e.g., phragmites)
- animal pests
- household pests (e.g., crawling insects)
- various nuisance pests.

In the last several years there has been increasing concern that previous methods of mosquito disease vector control have been inadequate with the increased incidence of positive human cases of West Nile Virus in Virginia. Aerial chemical pesticide spraying is an option under the IPMP to allow for better protection of human and animal health during mosquito-borne disease outbreaks. The option of aerial application of herbicides is proposed for the eradication of phragmites, an invasive common reed that is disrupting 2.5 acres of native salt marsh ecosystem along Mill Creek, Fort Monroe. Aerial application of pesticides for the control of mosquitoes and phragmites will conform to currently approved, regional application methods.

The No Action Alternative would be to not implement the IPMP and to continue with the pest control methods under the current pest management program, which would not entail the aerial application of pesticides for the control of mosquitoes and phragmites.

The environmental, human health and safety consequences of the Proposed Action and the No Action Alternative are discussed in relation to identified major issues and concerns associated with the implementation of the IPMP and, in particular, the aerial application of pesticides. Mitigating measures that address specific concerns are offered.

The U.S. Army notified the appropriate regulatory agencies by letter of its intention to implement the Proposed Action. The Proposed Action is addressed in the Finding of No Significant Impact.

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ACRONYMS AND ABBREVIATIONS

ACHP	Advisory Council on Historic Preservation
AFB	Air Force Base
AR	Army Regulation
B.t.i.	Bacillus thuringensis subspecies israelensis
CAA	Clean Air Act
CES/CEV	Civil Engineering Service/Environmental Corps
CFR	Code of Federal Regulations
CO	Carbon Monoxide
CEQ	Council on Environmental Quality
CZMA	Coastal Zone Management Act
DCR	Virginia Department of Conservation and Recreation
DEQ	Virginia Department of Environmental Quality
DGPS	Differential Global Positioning System
DoD	Department of Defense
DPW/L	Directorate of Public Works and Logistics
EA	Environmental Assessment
EFH	Essential Fish Habitat
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FAMCAMP	Big Bethel Reservoir Family Campground
HAN	Highly Aromatic Naptha
HRPDC	Hampton Roads Planning District Commission
INRMP	Integrated Natural Resources Management Plan
IPM	Integrated Pest Management
IPMC	Installation Pest Management Coordinator
IPMP	Integrated Pest Management Plan
LPMCAB	Lower Peninsula Mosquito Control Advisory Board
LMU	Land Maintenance Unit
MASS	Modular Aerial Spray System
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHL	National Historic Landmark
NMFS	National Marine Fisheries Service
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Preservation
NO _x	Oxides of Nitrogen
NSN	National Stock Number
Pb	Lead
PM ₁₀	Particulate Matter (≤ 10 micrometers)
PPE	Personal Protection Equipment
RCRA	Resource Conservation and Recovery Act
ROI	Region of Influence
RMA	Resource Management Area
RPA	Resource Protection Area
SIP	State Implementation Plan
SO _x	Oxides of Sulfur
ULV	Ultra Low Volume
USAF	United States Air Force
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VCP	Virginia Coastal Resources Management Program
VDACS	Virginia Department of Agriculture and Consumer Services

1.0 PURPOSE AND NEED FOR ACTION

1.1 Introduction

This Environmental Assessment (EA) addresses the environmental impacts associated with implementation of the Fort Monroe Integrated Pest Management Plan (IPMP). Fort Monroe is a 568-acre Army facility located in Hampton, Virginia. The facility is situated along the lower Chesapeake Bay in southeastern Virginia. Fort Monroe also owns the 500-acre Big Bethel area, which is located approximately nine miles northwest of the post. Big Bethel consists of a reservoir covering about 266 acres and an inactive water treatment plant. Together Fort Monroe and Big Bethel cover approximately 1,068 acres of land, of which 485 acres are improved grounds, 190 acres are forested, and 393 acres are unimproved. There are almost two million square feet of building space and 188 family housing units at Fort Monroe. Figure 1 shows the vicinity of Fort Monroe and the Big Bethel Reservoir in Virginia. Fort Monroe's workforce population is approximately 3,375, which includes civilians and military personnel. There are also approximately 600 family members residing on post.

Fort Monroe's vision is to be the modern "Home of Choice" for National Defense Agencies in a Historic Setting. The mission is to provide quality base operations support to National Defense Agencies through facilities, infrastructure, well-being and force protection. Services provided on post include dental and health; legal; community and family; religious; housing; and public works and logistics. Fort Monroe provides support to several tenant organizations including the U.S. Training and Doctrine Command (TRADOC), which is the major Army command responsible for training and educating Army soldiers and developing Army doctrine; Army Accessions Command; Cadet Command; Joint Task Force Civil Support; Defense Contract Management Agency, Southern Virginia; Futures Center; Installation Management Agency, Northeast Region; Army Contracting Agency, Northern Region; and Network Enterprise Technology Command Northeast. Private organizations on post include the Catholic Church, Old Point Comfort Bank, credit union and post office.

1.2 Purpose of Proposed Action

The purpose of the Proposed Action is to provide safe, effective, and environmentally sound pest management at Fort Monroe and Big Bethel by implementing the IPMP, which includes the potential use of aerial pesticide spraying for control of mosquitoes and common reed, *Phragmites australis* (hereinafter referred to as phragmites). The IPMP provides the framework and guidance through which Fort Monroe's Pest Management Program is defined and carried out on the installation. The plan identifies elements of the program including health and environmental safety, pest identification, pest management, as well as pesticide storage, transportation, use, and disposal. The plan is designed to reduce reliance upon pesticides, to enhance environmental protection, to maximize the use of integrated pest management (IPM) techniques, and to manage and coordinate pest control efforts. IPM strategies, which emphasize non-chemical pest treatments when possible, complement Fort Monroe's environmental stewardship objectives. The Fort Monroe IPMP includes prevention, treatment, and management techniques for controlling the following pests:

- disease vector and public health pests (e.g., mosquitoes)
- quarantine pests
- structural pests
- stored product pests
- ornamental plant and turf pests and diseases
- undesirable vegetation (e.g., phragmites)
- animal pests
- household pests (e.g., crawling insects)
- various nuisance pests.

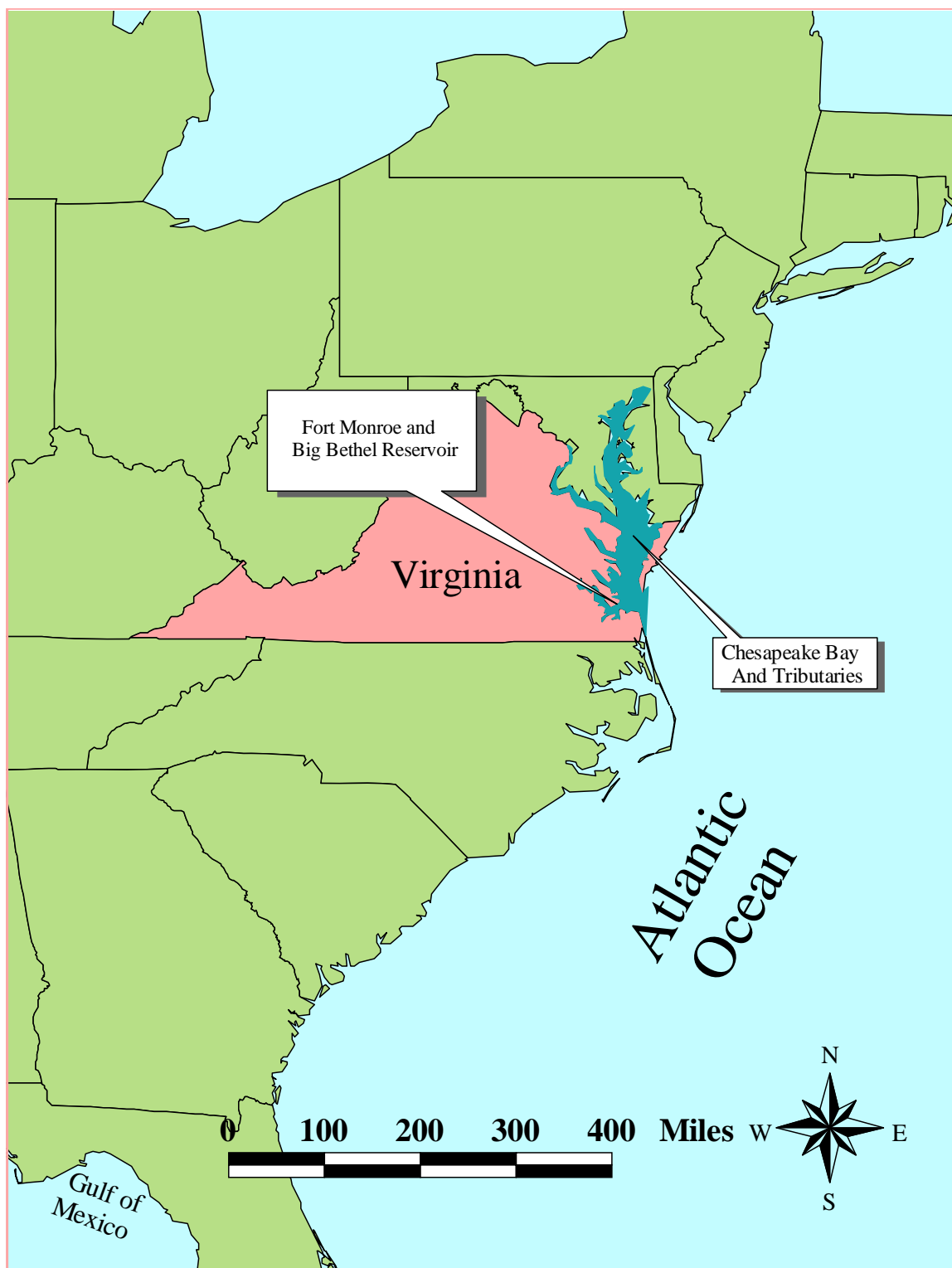


Figure 1. Vicinity Map of Fort Monroe and Big Bethel Reservoir, Virginia.

1.3 Need for Proposed Action

Fort Monroe's proximity to the environmentally sensitive Chesapeake Bay highlights the need for an IPM approach that utilizes non-chemical pest control where feasible. Biological, cultural, and mechanical/physical pest control techniques are preferred, and chemical pesticides are only used when other methods have been exhausted. Without an established IPM approach, unnecessary chemical insecticides and herbicides could be introduced to Fort Monroe's sensitive environment in circumstances where non-chemical techniques would have been sufficient.

Documentation of Fort Monroe's integrated pest management approach in the IPMP is required by Army Regulation (AR) 200-5, *Pest Management*, and DoD Instruction 4150.7, *DoD Pest Management Program*. According to these regulations, an IPMP should be a long-range, comprehensive installation planning and operational document that establishes the strategy and methods for conducting a safe, effective, and environmentally sound, integrated pest management program. Written pest management plans are required as a means of establishing and implementing an installation pest management program, and the IPMP fulfills one of the DoD *Measures of Merit* outlined in DoD Instruction 4150.7. The IPMP should identify the scope and importance of pest related problems, the assets and approaches required to limit these problems, and the resources and strategies to meet program shortfalls. It should be updated as necessary and reviewed at least annually. The IPMP should also include provisions for meeting the other DoD pest management *Measures of Merit*, which are a 50% reduction in pesticide usage using the FY02/03 average of pounds of active ingredient application as a baseline and the certification of pesticide applicators.

Fort Monroe's IPMP was finalized in 15 December 2003. The plan was developed by the Installation Pest Management Coordinator (IPMC) and approved by the Post Judge Advocate, the Director of Public Works, the Garrison Commander and the Army Environmental Center. As is emphasized in the IPMP, Fort Monroe strives to control pest species without the use of chemicals; however the plan does include provisions for the initiation of aerial pesticide spraying to control mosquitoes, if deemed necessary, for any given mosquito season. In the last several years there has been increasing concern that previous methods of mosquito disease vector have been inadequate with the increased incidence of positive human cases of West Nile Virus in Virginia (Virginia Mosquito Control Association, *Reported Cases of Mosquito Associated Diseases in Virginia*, <http://www.mosquito-va.org/disease.html>). Twenty-three mosquito species have tested positive for the transmission of West Nile Virus and all twenty-three species can be found in Virginia. Therefore, aerial chemical pesticide spraying is an option under the IPMP to allow for better protection of human and animal health during mosquito-borne disease outbreaks. For any given mosquito season, aerial chemical pesticide application would be employed if it were determined that other means of control have been exhausted or determined to be ineffective and/or impractical.

The IPMP also includes provisions for aerial spraying in order to control phragmites. The need for phragmites management is based on the reed's ability to disrupt native Virginia ecosystems. Phragmites is an introduced plant species that is not a food source for wildlife species in the U.S. It is found throughout the Chesapeake Bay Region and continues to expand rapidly. The spread of phragmites along Mill Creek at Fort Monroe crowds out native plant species, disrupts the natural shoreline and impedes drainage. Fish, mollusks, crustaceans, and other aquatic organisms are also negatively impacted by the disruption of their habitat.

1.4 Decision to Be Made

The Commanding Officer of Fort Monroe must decide whether or not to implement the IPMP. This decision will be based upon economics, safety, public health, and community desires, as well as the anticipated effects upon the environment. The need to implement mitigative measures to minimize any significant environmental effects shall also be considered.

1.5 Regulatory Guidance

This EA addresses the environmental impacts associated with implementation of the IPMP at Fort Monroe, Virginia, including the potential use of aerial pesticide spraying for the control of mosquitoes and phragmites. It is prepared in compliance with the National Environmental Policy Act (NEPA) of 1969, as amended, and in accordance with Council on Environmental Quality (CEQ) Implementing Regulations (40 CFR Parts 1500-1508) and 32 CFR Part 651, *Environmental Analysis of Army Actions*.

This EA includes identification and analysis of the requirements of additional environmental regulations, such as the Coastal Zone Management Act (CZMA), the Clean Water Act, the National Historic Preservation Act, the Endangered Species Act, the Clean Air Act (CAA), the Resource Conservation and Recovery Act, and the Chesapeake Bay Preservation Act. Pursuant to the CZMA of 1972, as amended, federal projects that are located within Virginia's designated coastal management area must be constructed and operated in a manner consistent with the Virginia Coastal Resources Management Program (VCP). Federal activities which are reasonably likely to affect any land or water use or natural resources of Virginia's designated coastal resources management area must be consistent with the enforceable policies of the VCP. As the lead agency for the VCP, the Virginia Department of Environmental Quality (DEQ) is responsible for coordinating the Commonwealth's review of federal consistency determinations and certifications with cooperating agencies and responding to the appropriate federal agency or applicant. This EA will be forwarded to DEQ and appropriate state and local agencies in order to obtain concurrence with the federal consistency determination (Appendix E) associated with Fort Monroe's proposed implementation of the IPMP.

1.6 Relationship to Other Decisions

The implementation of an IPMP is an integral component of Fort Monroe's natural resources program, as documented in the Integrated Natural Resources Management Plan (INRMP), *"Environmental Assessment, Integrated Natural Resources Management Plan, Fort Monroe and Big Bethel Reservoir, VA"*, and the Fort Monroe Real Property Master Plan (R&K Engineering, 2002). The IPMP, which would integrate a variety of pest control methods for the purpose of limiting the use of chemical pesticides, includes two pest control methods that are not currently employed at Fort Monroe. They are the aerial spraying of insecticide to control the local mosquito population and the aerial spraying of an herbicide to manage phragmites. The need to reduce the mosquito population with aerial treatment if necessary and the importance of containing the invasive phragmites species are both documented in the INRMP.

These procedures are currently conducted at the nearby Langley Air Force Base, and complete environmental analysis of these actions has been performed and documented in two EAs. The document entitled, *"Environmental Assessment for Aerial Dispersal of Pesticide for Mosquito Control, Langley Air Force Base, Virginia and Vicinity"* (Langley AFB, June 1997) was used as a reference for addressing aerial spraying for mosquitoes in this EA. Similarly, the *"Environmental Assessment on the Aerial Application of Herbicide and Post-Treatment to Control Invasive Species, Langley AFB, VA"* (Langley AFB, October 2001) was used as a reference for discussing phragmites control in this EA. The environmental analyses in both U.S. Air Force (USAF) EAs are highly relevant to this EA since Langley AFB and Fort Monroe properties are similarly situated on tributaries of the Chesapeake Bay (Figure 2), and the very same aerial

applicators and application procedures that Langley AFB employs would be extended to Fort Monroe and the Bethel Reservoir under the Proposed Action.

1.7 Organization of the EA

Section 1.0 provides a broad overview of the proposal by Fort Monroe to implement the IPMP. Section 2.0 provides a description of the IPMP and details of procedures that would be included in its implementation. Section 2.0 also describes the no action alternative. Section 3.0 describes the existing conditions of the environmental resource areas at Fort Monroe and Big Bethel that could possibly be affected by IPMP implementation. Section 4.0 provides an analysis of possible consequences to the environmental resources from the Proposed Action and the No Action Alternative. Section 5.0 examines potential cumulative impacts in conjunction with any previous, current or potential future actions, as well as a discussion of irreversible and irretrievable commitment of resources. Section 6.0 provides conclusions drawn from this analysis. Sections 7, 8, 9 and 10 provide a list agencies and persons consulted for the writing of this document, a list of preparers, the references cited throughout the document, and appendices.



Figure 2. Regional Aerial Map of Hampton, VA, including Fort Monroe, Big Bethel Reservoir and Langley AFB
(Photo taken 22 March 1994, USGS)

2.0 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES (DOPAA)

2.1 Description of Proposed Action

Fort Monroe proposes to implement the IPMP as the principal guide for conducting its Integrated Pest Management Program. The plan outlines program roles and responsibilities of Fort Monroe personnel; provides an inventory of land and facilities to which the plan applies; provides an annually updated inventory of program pesticides; describes a variety of integrated pest management techniques; provides guidance on storage, handling, application, disposal, and sale and distribution of pesticides consistent with regulatory requirements; and considers potential environmental, health and safety issues related to pest control techniques.

As described in Section 1.0, the IPMP emphasizes the DoD *Measures of Merit* requirement to reduce use of chemical pesticides; in addition to enhancing environmental protection; maximizing the use of IPM techniques; and meeting all Federal, state, local, and DoD pest management requirements. Even though the IPMP emphasizes the use of non-chemical strategies, chemical pest control may be used as an option in combination with other methods, such as mechanical/physical, cultural or biological control methods. While any one of these methods may solve a pest problem, several methods may be used in conjunction with each other to minimize use of chemicals and increase effectiveness. The plan addresses the variety of pest control options that are available for a various pests, which are organized into priorities of pest management. The pest management priorities are classified by the most common pests and are described in the following paragraphs. Section 4.0 of this EA will address the environmental consequences associated with the following pest control methods proposed under the IPMP, in particular the aerial spraying for the control of mosquitoes and phragmites, a pest control method not conducted under Fort Monroe's current pest management program. The Army will notify the DEQ's Tidewater Regional Office when aerial spraying activities are scheduled, and in the event of changes in the procedures to be employed or the scope of the area to be addressed.

Disease Vectors include mosquitoes, flies and other arthropods that may transmit disease, such as the Asian Tiger and Asian Bush mosquitoes. Of disease vector insects, the mosquito is the most efficient disease transmitter. Sources for mosquitoes on post are standing water in receptacles, tires, temporary flood zones, drainage ditches, and wetlands. The IPMP addresses options for the control of mosquitoes, such as:

- Education of post personnel and residents about removing mosquito harborage;
- Establishment of larvivorous fish in bodies of water;
- Application of larvicide to temporary standing water;
- Biological mosquito dunks;
- Pesticide fogging; and
- Aerial pesticide application, if necessary.

Within the Hampton, Virginia region, Fort Monroe and the Big Bethel Reservoir are candidates for aerial pesticide application, since they contain wetland and water areas that are prime mosquito-breeding sources. Aerial application of pesticides is a pest control method not currently conducted at Fort Monroe or the Big Bethel Reservoir, but is conducted in the surrounding Hampton region. The Proposed Action adds the option of aerial application of pesticides for the control of mosquitoes to Fort Monroe's current pest management program to ensure better protection during mosquito-borne disease outbreaks.

The following paragraphs summarize the required conditions for determining when aerial application of pesticides is warranted and the required procedures for safe aerial application of pesticides at Fort Monroe and the Big Bethel Reservoir. The following required conditions and

procedures are consistent with those described in Appendix A, *Fort Monroe Aerial Application of Pesticides Statement of Need*, and the *Environmental Assessment for Aerial Dispersal of Pesticide for Mosquito Control, Langley Air Force Base, Virginia and Vicinity*.

The necessity for aerial application of pesticide for the control of local mosquito populations for any given mosquito season would be determined by the Installation Pest Management Coordinator (IPMC); Fort Monroe Entomology Section; and Chief, Preventive Medicine Services, Fort Eustis in consultation with the Lower Peninsula Mosquito Control Advisory Board (LPMCAB). Aerial spray determinations will be based upon the following evaluation criteria:

- Regional human and animal illness and mortality reports attributable to mosquito-borne disease(s);
- The mosquito population potential as influenced by environmental and climatic conditions (i.e. tidal influence affecting salt marsh mosquito brood hatch);
- Actual mosquito count indices (light trap counts, larval dipping, landing rates); and
- Human complaints.

Aerial application would not take place unless all the evaluation criteria, including minimal mosquito surveillance thresholds (larval, adult light traps, adult landing rates), as determined by the LPMCAB, were met (Appendix B, *Minimum Threshold Levels Required for Action*, from the *Environmental Assessment for Aerial Dispersal of Pesticide for Mosquito Control, Langley Air Force Base, Virginia and Vicinity*). In addition, the LPMCAB would determine where mosquito hot spots are located on the Hampton peninsula, and if that were to include Fort Monroe and the Big Bethel Reservoir. Under most circumstances, only hot spots will be treated to limit aerial application areas, unless a significant mosquito-borne disease threat is present.

If aerial application of pesticides at Fort Monroe and/or the Big Bethel Reservoir is deemed necessary, Fort Monroe would employ the services of the U.S. Air Force Reserve (910 AW Aerial Spray Branch, Youngstown, Ohio), coordinated through nearby Langley AFB. The Air Force Reserve unit would provide a C-130H aircraft equipped with a Modular Aerial Spray System (MASS) and Differential Global Positioning System (DGPS); aircrews; and Virginia State certified/DoD certified Entomologists to coordinate and oversee all aerial application of pesticides. A qualified contractor could be employed to perform the overflights. The spray aircraft would be at an elevation of 150 to 300 feet, and the overflights would normally be initiated not earlier than three hours prior to sunset, if weather permits, and not last more than 2 hours. This is generally when mosquito activity (biting/feeding) is greatest and weather conditions (wind and humidity) are most favorable for insecticide applications. The season for heaviest mosquito infestations occurring at Fort Monroe and Big Bethel Reservoir area are from May through October. Aerial application of pesticides will not exceed three applications per mosquito season.

Ft. Monroe would be responsible for providing Dibrom® Concentrate (National Stock Number (NSN) 6840-01-270-9765, EPA Registration No. 5481-480), which is recommended in aerial application for adult mosquito control. The chemical is a formulation of 87.4% naled (1, 2-dibromo-2, 2 dichloroethyl dimethyl phosphate) with 12.6% inert ingredients. The label recommended rate of application is 0.5 – 1.0 ounce of undiluted Dibrom® Concentrate per acre by means of aerial ultra-low-volume (ULV) equipment or a mixture of Dibrom® Concentrate and highly aromatic naphtha (HAN). If Dibrom® Concentrate can not be used due to non-availability or ineffectiveness, another EPA approved alternate insecticide can be selected after consultation with DEQ; Virginia Department of Agriculture and Consumer Services (VDACS); and the USAF Reserve aerial applicators. In addition to the application of Dibrom® for the control of adult mosquito, *Bacillus thuringiensis* var. *israelensis* (B.t.i.) may be applied for the control of mosquito larvae. B.t.i. is a naturally occurring bacterium that may be aerially applied to wetlands to control larval mosquitoes. One example of a commercially available formulation of

B.t.i. is Vectobac® 12AS (EPA Reg. No. 275-102). The recommended application rate for Vectobac® is .25 – 1 pint per acre. Appendix C provides additional product information on product labels and material safety data sheets. Although it is anticipated that Dibrom and Vectobac will be used for mosquito control, the possibility exists that other VDACS-approved pesticides could be used in aerial spraying.

Quarantine Pests are pests, such as the gypsy moth, that warrant quarantine due to their potential negative economic impact to an area where the pest is not present, or present but not widely distributed. Quarantine pests are typically transported in cargo from one country to another for which there are no natural predators for that species. The U.S. Department of Agriculture (USDA) inspects incoming military family household goods and other cargo for the presence of Gypsy Moth. When quarantine pests are found on post, Entomology Shop personnel are notified immediately. Coordination with state authority is done to ensure proper control of the pests and limit pesticide treatments to the minimum needed to meet quarantine requirements. Other than the gypsy moth, there are no requirements for plant or animal quarantine on post.

Real Property Pests are structural/wood-destroying pests, such as the subterranean termite that causes damage to wooden buildings and other structures on the installation. Annual surveys of wooden structures and treatment when termites are found have reduced damage to a minimum. Carpenter ants occasionally invade wooden structures, particular where wet conditions exist. Treatment of the carpenter ant is performed to minimize the damage to structures where they are found. Non-chemical methods of structural pest control that will be emphasized are use of termite resistant construction practices, site sanitation, adequate ventilation of crawl spaces, and drainage of crawl spaces to reduce attractive harborage. When all other non-chemical methods of structural pest controls have been inadequate, the pesticide Termidor SC (EPA Registration No. 7969-210, VA Product ID No. 0008100156) would be applied according to product label.

Stored Product Pests, such as the rice weevil, flour beetle, and Indian meal moth, may infest food items stored in food service facilities and military family housing. Non-chemical methods of control of stored product pests are sanitation, harborage reduction, exclusion, and the use of pheromone traps and other traps. If non-chemical methods were found to be ineffective in the elimination of stored product pests then Pyrethrin (EPA Registration No. 499-310, VA Product ID No. 0088400101); or other pesticide that is EPA-approved for such use, would be spot applied using a hand sprayer to wall and floor crevices in food service facilities, as needed. Care would be taken to not contaminate food, water, utensils, china or food preparation sites or equipment. No humans or pets would be allowed to contact treated areas until dry.

Ornamental Plant and Turf Pests and diseases are various insect pests, such as whiteflies, aphids, webworms, mole crickets, white grubs, army worms and tent caterpillars, and diseases, such as Dutch elm disease, anthracnose, and blackspot, that can infest trees and shrubs on post, resulting in damage or destruction of the plants. Continental Park, the parade grounds, family housing areas, and common areas experience these types of plant pests. Typical pest control techniques include pruning and the use of disease and drought resistant, native plant species and turf varieties. Tent caterpillars cause problems annually, but other pests in this category have not required control on the installation in recent years. However, fire ants were found recently on post. Treatment of the pest was immediately implemented to prevent further spread. If non-chemical methods have proved ineffective in the control of ornamental plant or turf pests then CARBARYL®, WWP at 0.05 to 0.075% concentration (or other chemical pesticide EPA-approved for such use) would be applied by power sprayer and all safety precautions followed according to the product's label instructions.

Undesirable Vegetation are plant species, such as broad-leaved and grassy weeds that can be found in a variety of locations where they are not desired, such as along fence lines, road shoulders, graveled, and paved surfaces that require control using appropriate IPM methods. Control methods for these weeds would include physical removal, pruning, mowing, and at times the hand and power sprayer spot application of herbicides, such as Roundup Pro® (5% – 10%) that are designed and EPA registered for such purpose. As with all chemical pesticides, safety precautions would be followed according to the product label to avoid drift and exposure of non-target species.

An especially problematic undesirable vegetation is phragmites that, according to the 2003 USFWS Floral Survey of Fort Monroe (Lingenfelter et al., 2003), "...poses the greatest ecological threat to extant vegetative communities at Fort Monroe...." Phragmites is of particular concern as it has invaded Fort Monroe's Mill Creek salt marsh (Figure 3), occupying approximately 5 acres (Ligenfelter et al., 2003), and threatens to out compete the native species whose form and function typically define a healthy salt marsh ecosystem. Note that phragmites thrives in freshwater, as well as saltwater marshes; therefore, it is possible that phragmites could invade Big Bethel Reservoir wetlands, as well as, Fort Monroe.



Figure 3. Phragmites on Mill Creek at Fort Monroe

Under the IPMP, integrated pest management controls other than the use of chemical herbicides, such as prescribed burn, mowing, digging, and biocontrol, would be considered and employed when feasible. The spot application of the EPA-approved chemical herbicide, Rodeo® (active ingredient, glyphosate) from a backpack or truck boom sprayer, would be periodically used by certified applicators to control phragmites so that ecosystem integrity can be maintained. If these methods to control phragmites prove ineffective, then aerial application of herbicides would be conducted at Fort Monroe and the Big Bethel Reservoir in areas where phragmites has invaded. Aerial application of herbicides is a pest control method not currently conducted at Fort Monroe or the Big Bethel Reservoir, but is conducted at nearby Langley AFB, which is similarly situated on Chesapeake Bay and its tributaries. The Proposed Action adds the option of aerial application of herbicides for the control of phragmites to Fort Monroe's current pest management program to ensure better control and eradication of phragmites. Aerial application procedures would follow those outlined in *Fort Monroe's Aerial Spray Statement of Need for the Control of Phragmites* (Appendix D) and in the *Environmental Assessment on the Aerial Application of Herbicide and Post-treatment to Control Invasive Species, Langley AFB, VA* (Langley AFB, October 2001). A map included in the Statement of Need displays the 2.5 acres of phragmites growth along the eastern edge of Mill Creek where the aerial spraying

would occur. Fort Monroe would employ the services of the U.S. Air Force Reserve (910 AW Aerial Spray Branch, Youngstown, Ohio), coordinated through nearby Langley AFB. Qualified contractors could be employed to perform the aerial spraying. The following paragraphs summarize the required conditions and procedures for targeted and safe aerial application of an herbicide and post-treatment prescribed burning at Fort Monroe and the Big Bethel Reservoir for the eradication of phragmites.

Fort Monroe proposes to aerially spray Rodeo® herbicide in the fall (Oct-Nov timeframe) when most of the native species are senescing (dying back) and dormant (Ailstock et al., 1999) but while the phragmites is still actively photosynthesizing. Active photosynthesis is essential for the transport of glyphosate throughout the plant's vascular system, which then prevents plants from producing an essential amino acid. Selection of sites for treatment would be based on areas where phragmites could be controlled and possibly eradicated with minimal effort combined with the consideration of where the native species and habitats would have the greatest benefit. Approximately four months (Feb-Mar) later, a follow on post-treatment of prescribed burning would be employed at all sites. A combined treatment of herbicide and fire is the most effective method in the destruction of this plant and to remove the excessive plant material from the surface of the marsh to allow the native seed bank to germinate and grow (The Nature Conservancy, *Element Stewardship Abstract for Phragmites australis*, <http://tncweeds.ucdavis.edu/esadocs/documnts/phraaus.html>).

The Rodeo® herbicide (EPA Reg. No. 62719-324, VA Product ID No. 012300267, 53.8% glyphosate) will be applied by a helicopter from Langley AFB, at a rate of 4-6 pints Rodeo® to 3-20 gallons of water per acre and 0.5% nonionic surfactant per total spray volume, in accordance with the label directions. The reason for the range, 4-6 pints of Rodeo® and 3-20 gallons of water, is to accommodate differences in application equipment and to control spray droplet size, (bigger droplets drift less but they also penetrate the canopy less). Helicopter application was selected for this application since there would be greater control in targeting the spraying of herbicide to phragmites. The helicopter would be equipped with nozzles that produce a coarse spray to minimize drift and achieve uniform coverage. Adjuvants, such as a non-ionic surfactant, are EPA-approved and recommended on the product label to be mixed with Rodeo® to enhance control, reduce drift and for maximum effectiveness. The herbicide would not be applied if winds exceed 8 miles per hour, during high ozone periods, or if rain is predicted within a 24-hour period after application. The large droplet size and the wind speed are two ways to reduce the impact from the helicopter downwash. Second year application of Rodeo®, if needed, should be sprayed with 2 pints of Rodeo®/acre. The post-treatment prescribed burn would be conducted under the guidance of the Fort Monroe Fire Department, addressing measures to be taken to protect non-target plant species and post residents.

Animal pests, such as mice, occasionally invade buildings especially when the outside temperature drops. Non-chemical methods of control of rodents would be sanitation, exclusion, elimination of harborage; and sticky boards. If non-chemical methods of control are found to be ineffective then Contrac Blox® (NSN 6840-01-501-2858, EPA Registration No. 12455-79, VA Product ID No. 0009200024) would be maintained in infestable commodity warehouses. Tamper-proof bait stations would be used and product label safety precautions would be followed to prevent access by children and pets. Feral cats, stray dogs, raccoons, opossums, and other pests declared a nuisance occasionally need to be captured on the installation. Live traps are used to trap animals in a humane manner. They are to be turned over to the veterinarian for treatment or released where animals pose no danger to themselves, domestic pets, and humans.

Household and Nuisance Pests are crawling insects (i.e., ants, crickets, spiders, beetles, cockroaches, fleas, etc.) that may require treatment occasionally in family housing, food service facilities, warehouses, offices, and other administrative buildings. Non-chemical control methods

would include education of post residents on elimination of food and water sources, removal of means of entry into buildings by filling holes and cracks with caulking, window screening and insect traps. If non-chemical control methods have proved ineffective in the control of household pests, then EPA-registered chemical pesticides would be spot applied according to safe application product label instructions. Examples include Talstar One (EPA Registration No. 279-3206) or Demand CS (EPA Registration No. 10182-361) for roach control, and Intice Ant Gel (EPA Registration No. 73079-1) or Demand CS for control of ants.

Under the category of *Other Pest Management Requirements* falls the duty of pest controllers to remove carcasses and provide odor control services in buildings and other structures on the installation. Odors may arise from dead animals in walls, crawl spaces, and other spaces; decaying vegetation; molds; fungi; or other sources.

2.2 Description of the No Action Alternative

The No Action Alternative would be to not implement the IPMP. Under the No Action Alternative, Fort Monroe would continue with the pest control methods under its current pest management program, which entails the use of many control methods described under Section 2.1, with the following important exceptions. What differs between the pest management program under the No Action Alternative compared to the Proposed Action is that current pest control methods are not integrated under a plan for the purpose of reducing the overall use of chemical pesticides. Under the No Action Alternative, pest management projects might be implemented without integrated, coordinated guidance, especially those projects conducted under contractors, tenants, or other agencies. Progress towards achieving pest management program goals, such as reducing the need for and use of chemical pesticides, may not be monitored or evaluated effectively.

In addition, under the No Action Alternative, there is currently no provision for the aerial application of chemical pesticides for the control of phragmites or mosquitoes, of which the need for both has been addressed in Sections 1.3 and 2.1. The absence of an IPMP would make it difficult to attain goals of the Army's pest control management program that are also goals of Fort Monroe's INRMP. For example, the No Action Alternative does not provide for the aerial application of herbicides and post-treatment prescribed burning, which is considered the most effective combination of methods to control the spread of phragmites. Controlling the spread of phragmites is specified in Fort Monroe's INRMP, EO 13112, *Invasive Species* and in several USFWS surveys for preserving biodiversity and enhancing the native marine ecology of Fort Monroe's shoreline and marshes.

Also, the No Action Alternative impedes efforts to control the spread of vector borne disease outbreaks, by not providing Fort Monroe the option to control a mosquito infestation through aerial application of pesticides when current ground control measures are found to be inadequate.

Lastly, it should be noted that an integrated pest management plan is a requirement under AR 200-5, *Pest Management* and DoD Directive 4150.7, *DoD Pest Management Program*. The No Action alternative would make it difficult for Fort Monroe to secure funding to implement pest control projects that emphasize integrated pest management techniques. Lack of funds would not preclude implementing certain components of the IPMP for which funding is not required; however, under the No Action alternative, program priorities formulated to guide environmentally sound pest management techniques may not be implemented or integrated.

3.0 AFFECTED ENVIRONMENT

This section describes relevant environmental conditions at Fort Monroe, Big Bethel Reservoir and the surrounding region, for resources potentially affected by the Proposed Action and No Action Alternative described in Section 2.0. In compliance with guidelines contained in NEPA, CEQ regulations, and 32 CFR 651 (Environmental Analysis of Army Actions), the description of the existing environment focuses on those environmental resources potentially subject to impacts.

3.1 Human Health and Safety

Chemical pesticides are used under Fort Monroe's current pest management program, which entails human health and safety risks. Under the current pest management program, all pest management personnel who apply chemical pesticides participate in a medical surveillance program, which includes an initial, pre-employment physical examination and an annual re-examination. In addition, the current pest management program requires that all pesticides are used for their EPA-approved intended use and are applied according to product label safe practices.

Fort Monroe has a population of approximately 3,375 civilians and military personnel, and an additional 600 military family members reside on post. Particularly sensitive populations, such as children or the infirmed, are located at Fort Monroe's childcare center, the family housing quarters and the Army Health Clinic on Ingalls Road. Post employees, military and their families are notified prior to any chemical pesticide application and areas are cleared.

The only persons at the Big Bethel Reservoir would be Fort Monroe and Langley Air Force Base employees and temporary visitors to the Big Bethel Recreational Area and Family Campground (FAMCAMP). There are no housing facilities at the Big Bethel Reservoir.

3.2 Air Quality

Air quality in a given location is described by the concentrations of various pollutants present in the atmosphere. National Ambient Air Quality Standards (NAAQS) have been established by the EPA for six criteria air pollutants: carbon monoxide (CO), oxides of nitrogen (NO_x), oxides of sulfur (SO_x), particulate mater equal to or less than 10 micrometers in diameter (PM₁₀), ozone (O₃), and lead (Pb). NAAQS represent the maximum levels of background pollutants that are considered safe, with an adequate margin of safety to protect public health and welfare.

The ambient air quality of the Fort Monroe and Big Bethel Reservoir areas are within Federal standards for all pollutants measured except ozone. Fort Monroe and Big Bethel are located within a nonattainment area for the 8-hour ozone standard, as well as within a state designated volatile organic compound and nitrogen oxides emission control area. Since Fort Monroe is an administrative post, there are very few industrial activities that generate air pollutant emissions. Activities on Fort Monroe that produce air pollutants include fuel combustion and vaporization of volatile hydrocarbons from use of paints and solvents in maintenance of structures and equipment. Fort Monroe has a synthetic minor state-operating permit. Post emissions data is collected and submitted annually to DEQ to ensure permit compliance with state regulatory provisions.

The Big Bethel Reservoir has no stationary sources of air emissions now that water treatment plant operations have ceased. The only sources of emissions at the reservoir are mobile and consist of vehicle traffic at the FAMCAMP.

3.3 Noise

Fort Monroe is predominantly an administrative post that is almost completely surrounded by water and is located at the entrance of the Chesapeake Bay. Due to this separation from the mainland, few surrounding area noises affect Fort Monroe. Noise levels near the Fort Monroe's Old Point Comfort Marina are slightly elevated, partly due to vehicle traffic from the nearby Hampton Roads Bridge-Tunnel and vessel traffic from the Thimble Shoals channel and entrance into the Hampton Roads harbor. Sources of noise from within the post are generally confined to business hours and include vehicle traffic, periodic construction equipment operation, ceremonial cannon salutes, and occasional helicopter flights.

3.4 Water Resources

Fort Monroe is surrounded by the waters of Mill Creek to the west, the Chesapeake Bay to the east, and the confluence of the lower James River and Elizabeth River, at Hampton Roads Harbor, to the south. The shoreline at Fort Monroe totals 33,000 feet, more than half of which borders Mill Creek. Mill Creek is a tidal estuary with a surface area of 1.25 square miles, which includes approximately 80 acres of salt marsh. The southern end of Fort Monroe borders the Chesapeake Bay and the waters off the mouth of the lower James River, which is listed as "waters of concern" for nutrient enriched designation (2002 Virginia DEQ Integrated List of Assessed Waters). Waters of Concern are waters that meet water quality standards for designated use, but there is an apparent decline in water quality. DEQ considers area nutrient sources to be non-point and municipal point sources. Potable ground water is not available at Fort Monroe as the ground water is brackish because soils are predominantly porous marine deposits. Fort Monroe has a pretreatment permit from Hampton Roads Sanitation District to pretreat wastewater prior to discharge to the sanitary sewer. All storm water runoff from Fort Monroe and surrounding areas eventually flows into the environmentally sensitive Chesapeake Bay; so all post activities are considered to be potential contamination sources.

The Big Bethel Reservoir is an artificial impoundment of Brick Kiln Creek. The reservoir holds approximately 600 million gallons of water and was the primary source of drinking water for Fort Monroe and the Langley AFB until the Big Bethel Water Treatment Plant ceased operations in the fall of 2003. The Big Bethel Reservoir is surrounded by residential and urban development, which can be a source for stormwater runoff of oil, pesticides and other pollutants. Between reservoir water and the urban development is a buffer of grass and palustrine forested wetlands (Figure 6). According to the 2002 Virginia DEQ Integrated List of Assessed Waters, the Big Bethel Reservoir was considered to be "fully supporting", meaning that waters meet water quality standards that have been assessed and support Virginia's designated use.

The Chesapeake Bay Preservation Act (CBPA) was passed in 1988 to protect environmentally sensitive lands that lie alongside or near the shoreline of streams, rivers, and other waterways. The CBPA regulates areas within 500 feet from the shoreline of the waters of the Chesapeake Bay or any of its tributaries. The CBPA provides a level of protection for resource lands along streams and open water by requiring the local designation of Resource Protection Areas (RPAs) and Resource Management Areas (RMAs). RPAs include tidal wetlands and certain nontidal wetlands. RMAs are areas landward of RPAs that, if improperly used or developed, have a potential for causing significant water quality degradation or for diminishing the functional value of the RPA. Fort Monroe and the Big Bethel Reservoir include both RPAs and RMAs.

3.5 Land Use

Fort Monroe, located at the junction of the James River and Chesapeake Bay in Hampton, Virginia, consists of 568 acres, of which approximately 108 acres are under water. Land use is mixed on Fort Monroe, rather than separated, such as having a designated cantonment area, as is the case on many other Army installations. This is due, in part, to historical development and the adaptive reuse of existing structures, as facilities' requirements have changed over the years. The Fort Monroe Planning and Real Property Branch in the Directorate of Public

Works and Logistics categorize land use into seven visual zones and themes as illustrated in Figure 4. The largest proportion of land is considered open space.

Big Bethel Reservoir is located on the peninsula of Hampton Roads, Virginia, between the cities of Newport News, Hampton and York County and is approximately 20 feet above sea level. The 500 acres occupied by the reservoir and drinking water treatment facility are approximately 9 miles northwest of Fort Monroe. The Big Bethel Reservoir was the principal source of drinking water for Fort Monroe and nearby Langley Air Force Base until the fall of 2003 when the water filtration plant ceased operations. Land use at Big Bethel Reservoir is now limited primarily to outdoor recreation in the 49-acre Big Bethel Recreational Area and FAMCAMP leased to Langley Air Force Base. Adjacent to the reservoir is the Bethel Manor Family Housing, which is owned by the U.S. Air Force. Big Bethel Reservoir is also adjacent to non-military residential areas of Newport News, Hampton and York County.

3.6 Geology and Soils

Geologically, Fort Monroe is a barrier island that has become connected to the mainland naturally at the north end and artificially at the southwest end via a causeway. The topography at Fort Monroe is generally flat consisting of a large sand spit known as Old Point Comfort. Elevation begins at sea level, rising to 14 feet above mean sea level at Fort Monroe. The Big Bethel Reservoir is also flat with average elevation at 30 feet above sea level. Underlying Fort Monroe and Big Bethel Reservoir are marine sediments composed primarily of sedimentary formations of sand, clay, silt, gravel and marl. Much of the soil on the post is reclaimed land, and the soil conditions vary greatly throughout the post. Bedrock is found at depths of 1,000 to 1,500 feet. There are no minerals of economic significance at Fort Monroe or Big Bethel Reservoir.

3.7 Hazardous Materials and Waste Management

3.7.1 Hazardous Materials

The definition of hazardous material varies by Federal, state and local regulations. In general, hazardous materials can be defined as substances with strong physical properties of ignitability, corrosivity, reactivity, or toxicity that may cause an increase in mortality, a serious irreversible illness, an incapacitating reversible illness, or pose a substantial threat to human health or to the environment.

Since Fort Monroe is an administrative post, there are very few industrial activities that use hazardous materials and generate hazardous waste. Those activities at Fort Monroe that use hazardous materials associated with the refueling, maintenance and storage of equipment, boats or vehicles are the Naval Surface Warfare Center, Old Point Comfort Marina, Transportation Motor Pool, Roads and Grounds, and Military Police. Hazardous materials typically used by these activities are fuels, coolants, oils, solvents, and paints, which are stored at activities' work sites. The maintenance contractor for the Directorate of Public Works and Logistics' (DPW/L) is responsible for maintaining the utility systems and building equipment; and structural building maintenance, respectively. Types of hazardous materials used and stored include compressed gas cylinders, adhesives, paints, adhesives, cleaners, degreasers, stains, lubricants, welding compounds, metal cleaners and sewer additives. Most of these chemicals are in retail-sized containers and of brands identical to those found in hardware stores. Fort Monroe has a number of underground and aboveground fuel storage tanks, such as the three 6,000 gallon fuel storage tanks at the AAFES gas station and other smaller tanks for the storage of heating oil, diesel, gasoline, and oil.

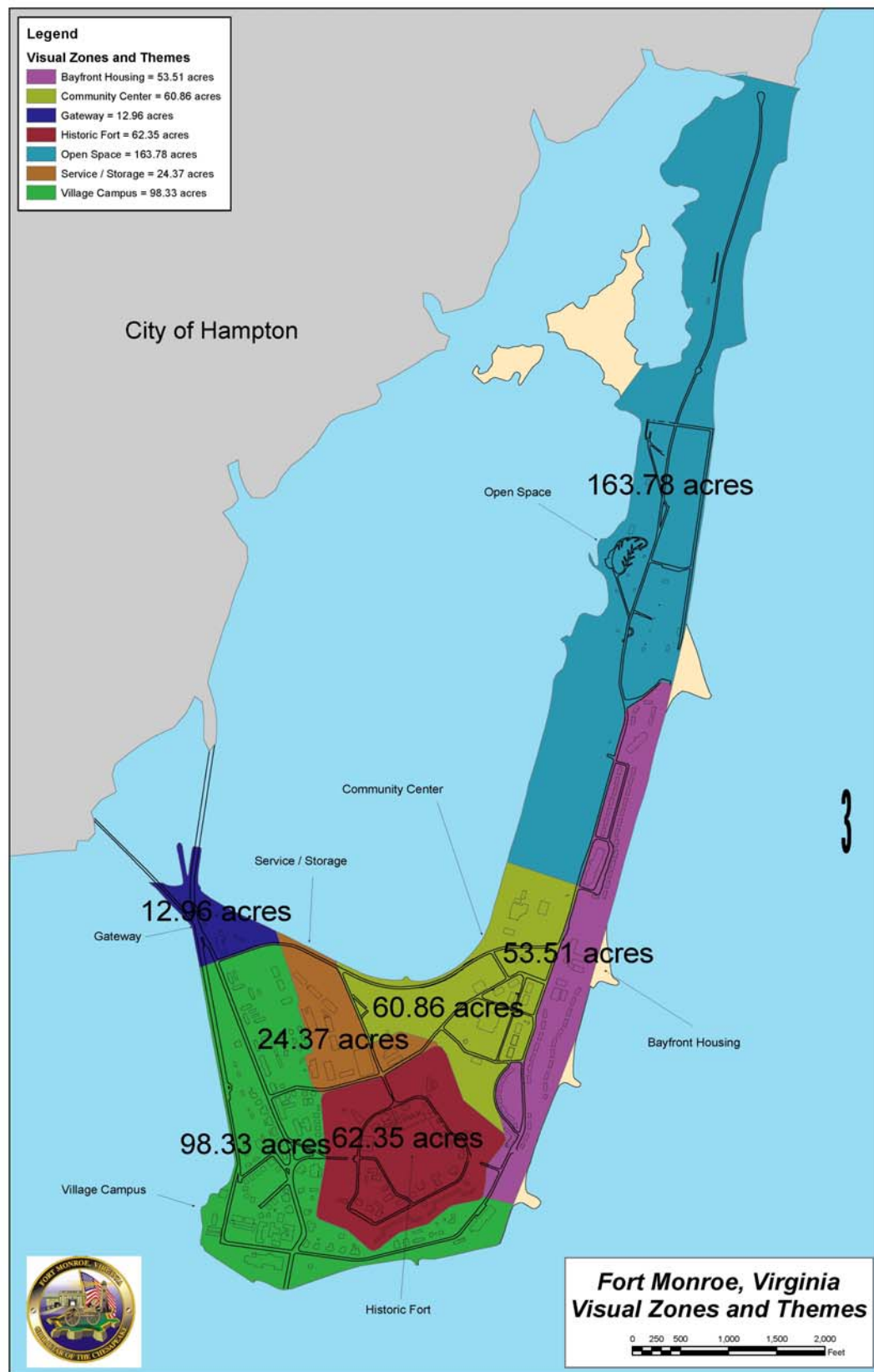


Figure 4. Land Management Units at Fort Monroe

The Entomology Shop on base uses pesticides for the control of various pests and maintains an inventory that is kept current. Fort Monroe's Pesticide Use Proposal (Table 2) lists all pesticides the installation uses (both in-house and by contract). Pesticides and herbicides are stored on racks and shelves in isolated, secured areas in the building. An activated carbon treatment system is utilized to treat any spillage. The mixing of pesticides for application is conducted in the entomology building only.

Table 1. Fort Monroe's Pesticide Use Proposal

Pesticide	Active ingredient(s) and (% AI)	Formulation	Target pest(s)	EPA Reg. #	Signal Word	State reg.
Demand CS	Lambda-cyhalothrin 9.7%	Suspension	Ants, roaches	10182-361	Caution	X
Anvil 2+2 ULV	3-phenoxybenzyl 2.0% Piperonyl Butoxide, Technical 2.0%	UVL	Mosquitoes	1021-1687-8329	Caution	X
ZP Rodent Bait	Zink-Phosphide 2.0%	Bait/Pellets	Rodents	12455-18	Caution	X
Contract Packs	Bromadiolone .005%	Bait	Rodents	12455-75	Caution	X
Contract Blox	Bromadiolone .005%	Bait	Rodent	12455-79	Caution	X
BioMist 3+15 ULV	Permethrin 3.0%	ULV	Mosquito	8329-33	Caution	X
TalstarOne	Bifenthrin 7.9%	Emulsion	Ant, Roach	279-3206	Caution	X
Delta Dust	Deltamethrin .05%	Powder	Ant, Roach	432-772	Caution	X
Drione Dust	Pyrethrin 1.0%	Powder	Ant, Roach	432-992	Caution	X
PT 565 Plus XLO	Pyrethrin .05%	Aerosol	Ant, Roach	499-310	Caution	X
Ultracide	Permethrin .4% n-octyl bicycl dicarb .4%	Aerosol	Flea	499-404	Caution	X
Dual Choice	Sulfuramid .5%	Bait	Ant	499-459	Caution	X
Mosquito Dunks	Bacillus thuringiensis 10%	Granules	Mosquito	6218-47	Caution	X
MaxForce Roach SM BS	Hydramethylnon 2.0%	Bait	Roach	64248-1	Caution	X
MaxForce Roach SM BS	Fipronil .05%	Bait	Roach	64248-11	Caution	X
MaxForce Roach Gel	Fipronil .01%	Bait	Roach	64248-14	Caution	X
MaxForce Ant BaitStation Sm	Hydramethylnon 1.0%	Bait	Ant	64248-2	Caution	X
Bora-Care	Disodium Octaborate 40%	Emulsion	Wood Borer	64405-1	Caution	X
Niban-FG	Orthoboric Acid 5.0%	Bait	Roach, Ant	64405-2	Caution	X
Intice Ant Gel	Orthoboric Acid 5.0%	Bait	Ant	73079-1	Caution	X
MaxAttrax Ant Bait station	Sulfuramid .05%	Granular	Ant	1812-348-8845	Caution	X
Gloden Malrin Fly Bait	(z)- 9-Tricosene .0490%	Granules	Fly	2724-274	Caution	X
Intruder HPX	Pyrethrins .05% Cyfluthrin .10%	Aerosol	Ant, Roach, Fly	9444-183	Caution	X
Altosid XR	(S)-Methoprene 2.1%	Briquette	Mosquito	2724-421	Caution	X
Shell-Guard	Disodium Octaborate Tetrahydrate 25.31%	Emulsion	Wood treatment	59905-6	Caution	X
Premise Gel	Imidacloprid .0010%	Gel	Termite	3125-544	Caution	X
MaxAttrax Uita Roach bait stn	Indoxacarb .10%	Bait	Roach	9688-193-8845	Caution	X
Termidor SC	Fipronil 9.10%	Soluble	Termite, Insect	432-901	Caution	X
565 PLUS XLO	Pyrethrins .50% Piperonyl butoxide 1.0%	Aerosol	Ant, Roach	499-290	Caution	X
Wasp Freeze & Hornet Killer	d-trans-allethrin .129% D-Phenothrin .120%	Aerosol	Wasp, hornet	499-362	Caution	X
ReJex-IT Fog	Methyl Anthranilate 40.0%	ULV	Bird Repellent	58035-7	Caution	X

Pesticide	Active ingredient(s) and (% AI)	Formulation	Target pest(s)	EPA Reg. #	Signal Word	State reg.
Jecta Diffusible Boracide	Boran Sodium Oxide Tetrahydrate 40%	Gel	Termites	64405-4	Caution	X
CB 80 Insecticide	Piperonyl butoxide 4.0% Pyrethrins .50%	Aerosol	Ant, roach	9444-175	Caution	X
Contact II	Diquat dibromide 1.85%	Soluble concentrate	Herbicide	10807-203-9838	Warning	X
Citrine Plus	Copper triethanolamine complex 9.0%	Soluble concentrate	Algaecide / Herbicide	8959-10	Danger	X
Liqua-Tox II	Diphacinone, Sodium Salt	Soluble concentrate	Rodent	12455-61	Caution	X
MaxAttrax Roach Powder	Orthoboric Acid 99.0%	Powder	Roach	9444-130-8845	Caution	X
Bayleton	Chlorophenoxy 50%	WSP	Turf/plant disease	3125-491-10404	Caution	X
Rite Hite	Pyridazinone 21.7%	EC	Plant Growth	2155-104-6532	Warning	X
Horticultural Oil	Petroleum Distillate	EC	Insect/mite	10404-66	Caution	X
Roundup Pro	Glyphosphate 41%	LC	Weed	524-475	Caution	X
Weeds R Gone	Bromacil 1.22%	LC	Weed	2155-100-50735	Caution	X
Top to Bottom	2-4D 1.09% Bromacil .98%	RTU	Broadleaf/Grassy Weed	3862-143-50735	Warning	X
Trimec Classic	2-4D 0.63% MCPP 2.08% Dicamba 0.25%	EC	Broadleaf Weed	2217-543	Danger	X
Ornamec	Fluazifop 6.75%	EC	Grassy Weed	2217-728	Warning	X
Momentum G	2-4D 1.06% Pyridinyloxacetic acid .079% Pyridinecarboxylic acid .028%	Granule	Broadleaf Weed	228-340-10404	Caution	X
Momentum L	2-4D 50.7% Pyridinyloxacetic acid 3.85 Pyridinecarboxylic acid 1.3%	EC	Broadleaf Weed	228-321-10404	Danger	X
Image	Imazaquin 70%	DG	Grassy Weed	241-319	Caution	X
Manage	Methyl 5 75%	DG	Sedge	524-465	Caution	X
Ronstar G	Oxadiazon 2.0%	Granule	Annual Weed	432-886	Warning	X
Snapshot	Trifluralin 2.0%	Granule	Annual Weed	62719-175	Caution	X
Cygon	Dimethoate	EC	Insect/Mite	4-256-50735	Warning	X
Pre-M	Pendimethalin 0.86%	Granule	Crabgrass/Annual Weed	10404-82	Caution	X
Growth Spikes	Nitrogen 11% Potash 5% Potassium 7%	Solid Push Spikes	Ornamental tree and plant vigor			X
Liqua Green	Nitrogen 16 % Potash 8 % Potassium 4 %	Liquid Concentrate	Turf and plant vigor			
Ferromec AC	Nitrogen 15 % Sulfur 3 % Iron 6 %	Liquid Concentrate	Micro nutrient Deficiencies		Caution	
Micro Boost	Chelated Magnesium 1.0% Chelated Iron 3.0% Chelated Manganese 4.0% Sulfur 5.5%	Liquid Concentrate	Micro nutrient Deficiencies		Caution	
Likwa Lime	Calcium carbonate 27.1% Magnesium Carbonate 22.9% Calcium carbonate Equiv. 54.5%	Flowable micronized dispersion	Soil ph corrections		Caution	
Contact II	Diquat Dibromide 1.85%		Aquatic Weed	10807-203-9838	Warning	

Pesticide	Active ingredient(s) and (% AI)	Formulation	Target pest(s)	EPA Reg. #	Signal Word	State reg.
DTW Select	24D .326% MCPP .328% Dicamba .324%	Aerosol	Broadleaf weed Selective	228-190-9838	Caution	
Weed Free # 1	24D .63% MCPP 2.08% Dicamba .25%	Emulsion	Selective Broadleaf weed	3862-145-50735	Caution	
Disappear	24D .63% MCPP 2.08% Dicamba 0.25%	Emulsion	Selective Broadleaf weed	2155-62	Caution	

Source: Fort Monroe Pest Management Coordinator

Pesticide usage has been significantly reduced in the last decade as Fort Monroe began to implement some of the principles of integrated pest management. Pesticide usage in 1993 was approximately 11,000 pounds, but has been reduced to approximately 1,000 pounds per year.

Some miscellaneous activities on base that store and use hazardous materials are the two pools on base that use liquid chlorine. Also, the Frame and Craft Shop provides recreational craft activities and stores a variety of paints, adhesives, stains, lacquers, and cleaning solvents for use in the facility.

All hazardous materials are managed under Fort Monroe's Hazardous Materials Management Program (HMMP). Through the use of an authorized user's list, the HMMP limits the type and quantity of hazardous materials used on post.

3.7.2 Hazardous Waste

Hazardous wastes are any solid, liquid, contained gaseous or semisolid waste, or any combination of wastes that pose a potential hazard to human health or the environment. Hazardous wastes are defined and regulated under Federal Resource Conservation and Recovery Act (RCRA) regulations 40 CFR Part 240-299 and Virginia hazardous waste regulations 9 VAC 20-60. They outline hazardous waste storage, transportation and disposal compliance requirements. Any of the activities listed under Section 3.7.1 that use hazardous materials have the potential to generate hazardous waste. Fort Monroe is designated as a RCRA large generator of hazardous wastes (VA5210020020603). Fort Monroe also falls under the DEQ's Federal Facilities Installation Restoration Program (VA7213720603). In addition Fort Monroe has a Formerly Used Defensive Site (Ft. Wood) associated with it (FUDS-VA9799F1583). Fort Monroe's Environmental Division manages and disposes of hazardous waste consistent with their Hazardous Materials and Waste Management Plan and all applicable Federal, state and local disposal requirements. Non-hazardous solid waste is also handled and disposed of in full compliance with all Federal, state and local regulations.

3.8 Coastal Zone, Wetlands, and Floodplains

3.8.1 Coastal Zone

The federal Coastal Zone Management Act (CZMA) of 1972 provides direction to states for developing land/water use programs, managing development, and protecting natural resources in coastal zones. Pursuant to the CZMA, federal projects that are located within Virginia's designated coastal management area must be managed in a manner consistent, to the maximum extent practicable, with the Virginia Coastal Resources Management Program (VCP). The Virginia Department of Environmental Quality (DEQ) administers the VCP. Federal activities which are reasonably likely to affect any land or water use or natural resources of Virginia's designated coastal resources management area must be consistent with the enforceable policies of the VCP. The enforceable policies of the VCP relate to the following:

- fisheries management

- subaqueous lands management
- tidal and nontidal wetlands management
- dunes management
- non-point source pollution control
- point source pollution control
- shoreline sanitation
- air pollution control
- coastal lands management.

Fort Monroe and Big Bethel Reservoir fall within Virginia's designated coastal zone.

3.8.2 Wetlands

Executive Order 11990, *Protection of Wetlands*, requires that each federal agency "shall provide leadership and shall take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands." Wetlands are protected under Section 404 of the Clean Water Act, and federal "jurisdictional" wetlands fall under the jurisdiction of Army Corps of Engineers. The predominant wetland types at Fort Monroe are emergent estuarine (Figure 5), while those at Big Bethel Reservoir are primarily palustrine forested wetlands (Tiner et al., 1998). On the northern edge of the post, Fort Monroe has 67 acres of tidal salt marsh, which is classified as "Group One", the highest quality and most ecologically productive wetland (R&K Engineering, 2002). Fort Monroe prohibits filling and dredging in this area. The Big Bethel Reservoir contains 75 acres of wetlands, most of which are palustrine (forested or emergent) in nature (Figure 6).

3.8.3 Floodplains

Executive Order 11988, *Floodplain Management*, requires that each federal agency "shall provide leadership and shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains." Fort Monroe is entirely within a 100-year floodplain. Flooding at Fort Monroe is frequent and often severe. Big Bethel Reservoir east of the impoundment is also within a 100-year floodplain.

3.9 Biological Resources

A comprehensive survey, "Biological Diversity Survey of the Flora and Fauna of Fort Monroe and Bethel Reservoir" (Galvez et al., 1998), was conducted by the U.S. Fish and Wildlife Service (USFWS) to determine the biological diversity in vegetation, fish, amphibians, reptiles, birds and mammals inhabiting Fort Monroe and Big Bethel Reservoir. In this survey, USFWS consider Big Bethel Reservoir and Fort Monroe to be biological islands, since they are isolated habitats surrounded by barriers to movement such as highways and saltwater, respectively (Galvez et al., 1998). There is not a wide array of species at Fort Monroe since it is near 100% utilization; is highly urbanized; has exposure to salty winds and water, and a shortage of freshwater. The primary limitations for flora and fauna are habitat size and exposure to humans (Galvez et al., 1998). Tiner et al. (1998) also identified a number of animal and plant species while conducting a Wetlands Inventory Report for Fort Monroe and Big Bethel Reservoir. In addition, a 2003 USFWS (Lingenfelser et al.) survey of the flora at Fort Monroe was conducted to provide the Department of the Army with a follow-up survey to the 1998 USFWS Biodiversity Survey (Galvez et al., 1998). The following is a brief summary of surveys' results for each biological resource area.

3.9.1 Terrestrial Communities (Flora and Fauna)

3.9.1.1 Flora

Lingenfelser et al. in 2003 surveyed Fort Monroe "natural areas" along Dog Beach; several managed areas, with infrequent or no maintenance (i.e., shoreline areas, batteries, jetties)

where vegetation is allowed to grow; marsh islands located within Mill Creek; and plants in developed areas of the installation. Lingenfelser et al. documented 380 plant species occurring at Fort Monroe, including 22 species considered invasive and undesirable, such as Stendel common reed (*Phragmites australis*) and Red Lovegrass (*Eragrostis secundiflora* var. *Oxylepis*). Fort Monroe has close to 650 oak trees, 500 of them being live oaks. The Fort Monroe area is the northern most habitat of Live Oak (*Quercus virginiana*) and several specimens on the installation are believed to be over 400 years old.

Big Bethel Reservoir has considerably higher floral diversity, being comprised primarily of mature bottomland hardwood forests with understory components and palustrine (forested or emergent) wetlands (Tiner et al., 1998). A total of 249 species of trees were identified at the Big Bethel Reservoir. No plants were recorded during the Biodiversity survey of the reservoir. However, Tiner et al. (1998) identified 20 plant species while conducting the Wetlands Inventory Report at Fort Monroe and Big Bethel Reservoir.

3.9.1.2 Fauna

The USFWS survey found 24 mammal species inhabiting Fort Monroe and 15 mammal species at Big Bethel Reservoir, all common to the Peninsula, such as the shorttail Shrew (*Blarina brevicauda*), Beaver (*Castor Canadensis*), and Marsh Rabbit (*Sylvilagus palustris*), to name only a few.

The USFWS Biodiversity Survey also found 217 bird species at Fort Monroe and Big Bethel Reservoir, a number that comprised more than half of all bird species in the state of Virginia. Galvez et al. (1998) reported that 68 bird species use Fort Monroe and Big Bethel Reservoir for breeding. Flocks of gulls, ducks, Canada geese and other birds use the reservoir in the hundreds. During the wetland inventory (Tiner et al., 1998), osprey were observed at the reservoir and Fort Monroe, which were not observed during the 1998 USFWS Biodiversity Survey.

It was expected that no amphibians or reptiles would be found at Fort Monroe, due to habitat degradation, urban development and human presence. However, four species of amphibian and 14 species of reptile were documented at the Big Bethel Reservoir, such as the Common Bullfrog (*Rana catesbiana*), the Red-backed Salamander (*Plethodon cinereus*), the Black Rat Snake (*Elaphe obsoleta*) and the Eastern Painted Turtle (*Chrysemys picta*).

3.9.2 Marine and Freshwater Aquatic Communities

During the 1998 USFWS Biodiversity Survey, a total of 19 species of fish representing 12 families were found in the high salinity waters of Mill Creek adjacent to Fort Monroe. The area is a suitable nursery and spawning habitat for anadromous fish. Sea turtles were not included in the biodiversity report since no nesting habitat is found along Fort Monroe beaches although they frequently wash up on the beach at Fort Monroe.

The Big Bethel Reservoir is stocked with several species of game fish. The USFWS survey identified a total of 18 freshwater fish taxa representing 12 families in the Big Bethel Reservoir, of which 85% are considered native species. The USFWS survey concluded that the Big Bethel Reservoir offers excellent habitat for freshwater aquatic species as evidenced by turtle diversity and the number of otters and aquatic birds. Brick Kiln Creek, which is the body of water impounded to create the Big Bethel Reservoir, allows for the migration of fishes, reptiles and amphibians near Bethel.

Recognizing the importance of fish habitat to the productivity and sustainability of U.S. marine fisheries, in 1996 Congress added new habitat conservation provisions to the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act), the federal law that governs U.S. marine fisheries management. The re-named Magnuson-Stevens Act

mandated the identification of Essential Fish Habitat (EFH) for managed species as well as measures to conserve and enhance the habitat necessary for fish to carry out their life cycles. The Magnuson-Stevens Act requires cooperation among National Marine Fisheries Service (NMFS), the Councils, fishing participants, Federal and state agencies, and others in achieving EFH protection, conservation, and enhancement.

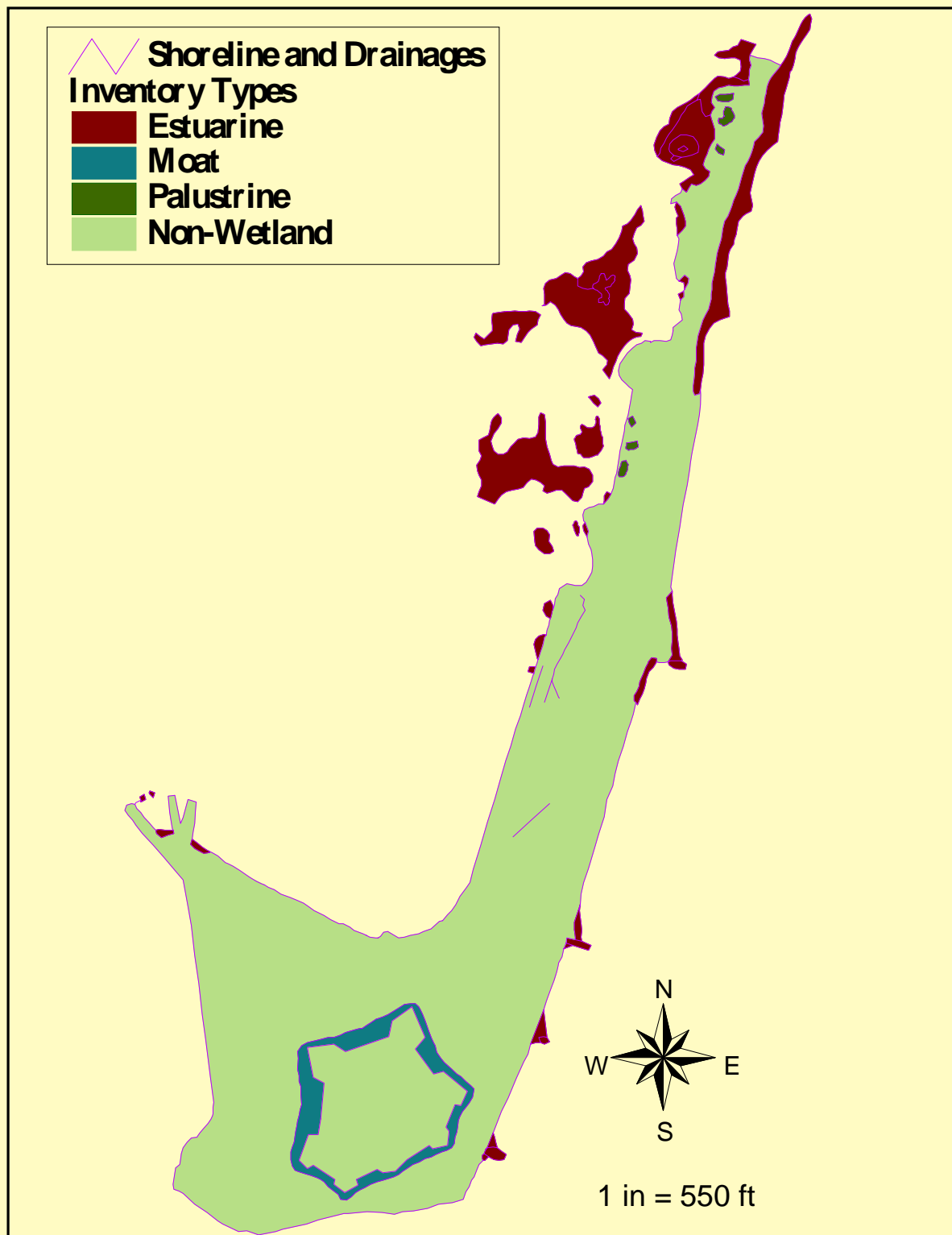


Figure 5. Fort Monroe Wetland Inventory
(Tiner et al., 1998)

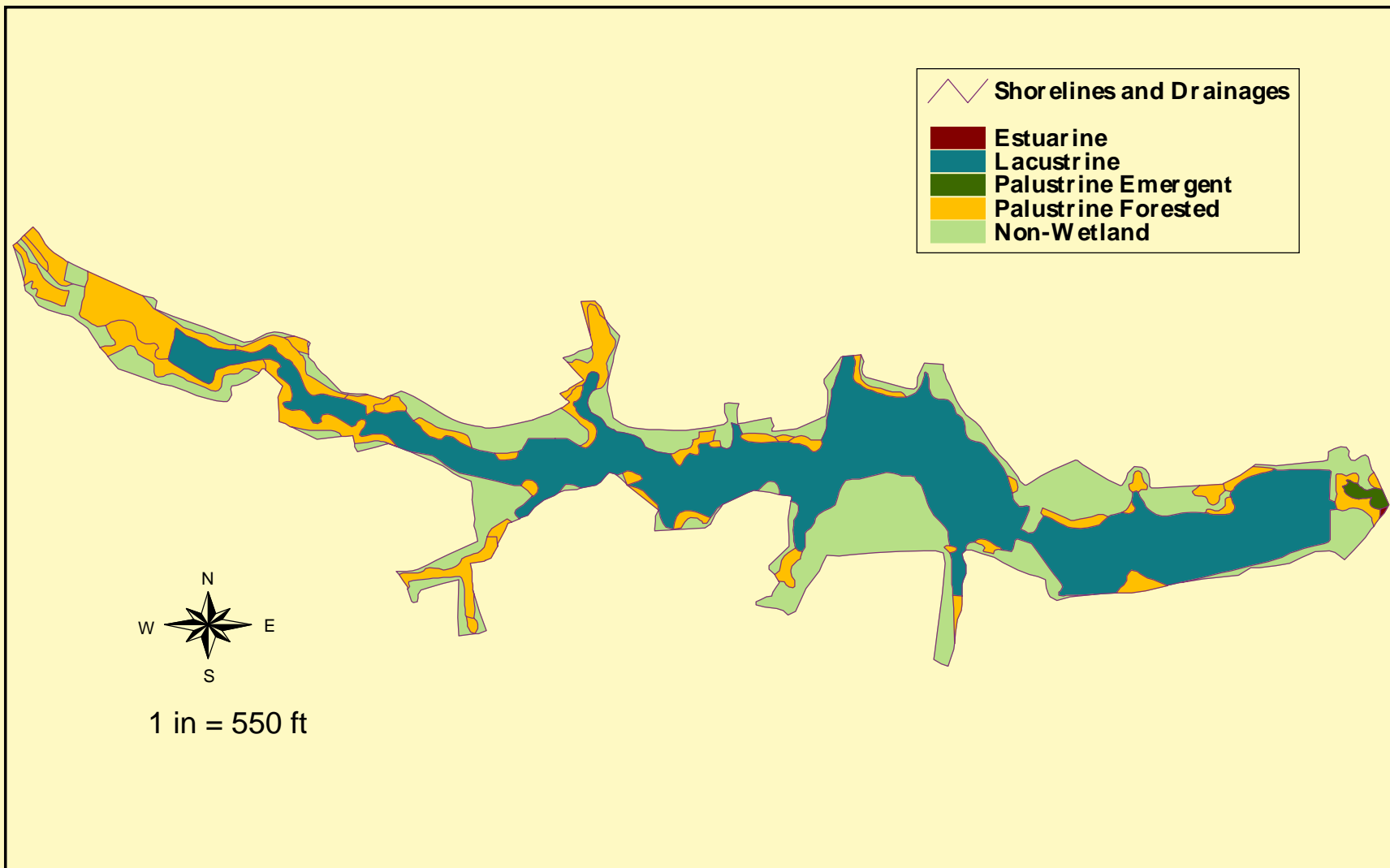


Figure 6. Big Bethel Reservoir Wetland Inventory
(Tiner et al., 1998)

There is an Essential Fish Habitat for waters within the Chesapeake Bay from Old Point Comfort on the south (Fort Monroe), north to the Back River Inlet, and up to Drum Point at the Drum Island Flats for the following fish species: windowpane flounder (*Scopthalmus aquosus*), bluefish (*Pomatomus saltatrix*), Atlantic butterflyfish (*Peprilus triacanthus*), summer flounder (*Paralichthys dentatus*), black sea bass (*Centropristus striata*), king mackerel (*Scomberomorus cavalla*), Spanish mackerel (*Scomberomorus maculatus*), cobia (*Rachycentron canadum*), red drum (*Sciaenops ocellatus*), dusky shark (*Charcharinus obscurus*) and sandbar shark (*Charcharinus plumbeus*).

3.9.3 Threatened, Endangered and Special Status Species

No federally endangered, threatened, or of special concern plants, fish, or mammals were identified at Fort Monroe or Big Bethel Reservoir during the 1998 USFWS Biodiversity Survey (Galvez et al., 1998). Although the state endangered canebrake rattlesnake (*Crotalus horridus atricaudatus*) and the threatened Mabee's salamander (*Ambystoma mabeei*) may occur at Fort Monroe, neither of the species was found during the same 1998 USFWS Biodiversity Survey.

Although two threatened bird species, bald eagle (*Haliaeetus leucocephalus*) and piping plover (*Charadrius melodus*), are known to nest periodically in Hampton and York counties, none were actually sighted during the recent biodiversity survey (Galvez et al., 1998). However, the Fort Monroe INRMP notes that bald eagles, piping plovers, and peregrine falcons (*Falco peregrinus*) nest periodically on portions of Fort Monroe (Ft. Monroe, 2000). The peregrine falcon was removed from the federal list of threatened and endangered species on August 25, 1999. It has been designated as a federally recovered species and is currently being monitored throughout its range (<http://endangered.fws.gov>). The peregrine falcon continues to be on the state list as a threatened species. The state threatened gull-billed tern (*Sterna nilotica*) has also been recorded on the installation.

Many birds seen at Fort Monroe and the Big Bethel Reservoir are protected by the Migratory Bird Treaty Act of 1918 (as amended). Two migratory bird breeding species found at Fort Monroe and Big Bethel Reservoir (Galvez et al., 1998) carry a special concern status by the Virginia Department of Conservation and Recreation (2001), the great egret (*Ardea alba*) and the yellow-crowned night heron (*Nyctanassa violacea*). Although these species are rare within the state, they are locally common, evidenced by a heron rookery at the Big Bethel Reservoir (DPW/L, G. Wesson, 2004). Both species prefer fresh and brackish waters; and salt marshes; forage in shallow waters, migrate into the area in early spring, breed mid-spring through mid-summer, and migrate out of the area in the fall, since they are not winter residents. The great egret eats fish, frogs, small snakes, crayfish, snails and salamanders; the yellow-crowned night heron's diet is comprised mostly of crustaceans. Nests of the great egret have been seen at Big Bethel Reservoir. The yellow-crowned night heron nests in trees throughout Fort Monroe.

Other migratory birds include great blue herons (*Ardea herodias*), ospreys (*Pandion haliaetus*), all types of waterfowl, and several pairs of northern American kestrels (*Falco sparverius* spp.). If present, the USFWS will be consulted on an appropriate course of action since the birds are protected under the Migratory Bird Treaty Act and EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*.

Fort Monroe may also harbor four species of moths that are listed as rare by the Commonwealth of Virginia. These moths, *Metria amella*, *Panopoda repanda*, *Heterocampa astarte*, and *Cymatophora approximaria*, feed extensively on live oaks (*Quercus virginiana*) in their larval phase. There are approximately 500 live oaks on Fort Monroe. *Cymatophora approximaria* also feeds on greenbrier and ciliate meadow-beauty. A survey has not been conducted to confirm the presence or absence of the rare moths on Fort Monroe.

3.10 Cultural Resources

The National Historic Preservation Act establishes guidelines for the protection, enhancement, and preservation of any property that possesses significant archaeological, architectural, historical, or cultural characteristics. Section 106 of the National Historic Preservation Act (NHPA) mandates that federal agencies take into account the effect of their undertakings on properties included in or eligible for inclusion in the National Register of Historic Places (NRHP). The Section 106 process of the NHPA requires that a federal official provide the State Historic Preservation Officer (SHPO) and/or the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment on any federal undertakings that may affect historic properties. Section 110 mandates that federal agencies establish a program to locate, inventory, and nominate all their properties that might qualify for inclusion on the NRHP. In accordance with Section 110(f) of the NHPA, federal agencies are required to minimize harm or adverse effects to any National Historic Landmark (NHL). Due to its historical and military significance, Fort Monroe has been designated as a NHL. The entire post within the seawall is included in this designation; however, the various structures within the landmark are divided into several categories based upon their historical or architectural significance.

At the Big Bethel reservoir there are two historic cemeteries, Big Bethel Baptist Church Cemetery and Ebenezer Church Cemetery that are located along the reservoir shoreline. The Big Bethel Water Treatment Plant, located at the southeastern end of the reservoir, entails some approximately 100-year old brick buildings that have never been assessed by the SHPO for historical significance or NRHP status.

3.11 Socioeconomic Environment

Socioeconomics is defined as the basic attributes of population and economic activity within a particular area or region of influence. Socioeconomics typically encompasses population, employment and earnings, and industrial and commercial growth.

Fort Monroe and Big Bethel Reservoir are located in the City of Hampton. According to the 2000 Federal Census, Hampton's population was 146,437 residents, an increase of 9.5 percent from the 1990 population of 133,793 residents. The current rate of population change between 1990-00, if continued, would result in a population in 2025 of 183,500. That is 25.3 percent more people than the year 2000 population. Hampton's population is racially diverse and aging.

According to analysis of census data by the Hampton Roads Planning District Commission (HRPDC), in 2002, 45% of land was used for residential purposes, 30% public and semi-public, 16% was either vacant or agricultural use, 7% commercial use and 3% industrial use. The average per capita income in the City of Hampton has increased from 1990-2000 to \$21,364, which is low for the region and for the state. The rate of employment growth is lower than for the region as a whole.

The HRPDC has completed a study on the impact the military has on the Hampton Roads economy that confirms the crucial nature of federal government defense expenditures in the area's economy. Employment in defense industries accounted for 25.4 percent of all employment on the Peninsula where Fort Monroe is located. The HRPDC reported in August 2002 that military bases in the City of Hampton, including Fort Monroe and Langley AFB, contribute an additional 3.9% in population from those employed by military bases.

According to the March 2004 Fort Monroe population data, the workforce on Fort Monroe consists of 1,509 military personnel and 1,500 civilians; the total workforce (to include contractors and non-appropriated funding employees) was 3,617. In addition, there were approximately 600 family members living on post. Military, federal government employees and

defense contractors provide a significant economic base in the Hampton Roads region and the majority live in and support nearby communities.

3.12 Environmental Justice and Protection of Children

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, was promulgated in 1994 to ensure that no individual or community, regardless of race, ethnicity, or economic status, bears a disproportionate share of adverse impacts to human health or environmental condition resulting from the execution of federal actions. Fort Monroe's population is racially diverse and economically prosperous so there are no areas on post that contain predominantly minority or low-income populations. Big Bethel Reservoir is not inhabited.

Environmental justice issues also include protection for children. The intent of EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, makes it a high priority to identify and assess environmental health and safety risks that may disproportionately affect children. The Army observes every reasonable precaution in the planning and execution of all operations in order to prevent injury to people or damage to property. Children are present at Fort Monroe at family housing, medical facilities, community centers, places of religious worship, and the childcare center.

4.0 ENVIRONMENTAL CONSEQUENCES

Section 4.0 describes the environmental consequences of the Proposed Action and No Action Alternative at Fort Monroe and Big Bethel Reservoir for the resource areas discussed in Section 3.0. To define the consequences, this section evaluates the IPMP elements described in Section 2.0, in particular the aerial spraying for the control of mosquitoes and phragmites, to the affected environment provided in Section 3.0. Cumulative effects of the Proposed Action with other foreseeable future actions are presented in Section 5.0.

4.1 Human Health and Safety

4.1.1 Proposed Action

The employment of integrated pest management techniques, which emphasize the use of non-chemical controls where feasible, would minimize the potential health and safety effects due to pesticides. It is anticipated that the overall usage of chemical pesticides would be decreased by the implementation of the Proposed Action. The IPMP documents proper procedures to ensure that both pest management personnel and the public are not adversely affected by the implementation of pest management operations including pesticide application. Personnel who apply pesticides participate in a medical surveillance program, utilize appropriate personal protective equipment (PPE) and receive regular training in proper pest control techniques. The IPMP also specifies the necessary precautions to be taken to protect the public, on and off post. These include consideration of the weather conditions and sensitive populations (e.g. child development center and the health clinic) prior to pesticide application.

The aerial application of Rodeo® (active ingredient, glyphosate) to eradicate phragmites would not have significant human health and safety effects, primarily since glyphosate is specific to plant physiology by preventing plants from producing an essential amino acid and thereby inhibiting growth. The EPA states in a 1993 Re-registration Eligibility Decision (RED) document that "Glyphosate is of relatively low oral and dermal acute toxicity. It has been placed in Toxicity Category III for these effects (Toxicity Category I indicates the highest degree of acute toxicity, and Category IV the lowest). The acute inhalation toxicity study was waived because glyphosate is nonvolatile and because adequate inhalation studies with end-use products exist showing low toxicity." The EPA RED goes on to say that there are no chronic health effects based upon laboratory studies. Glyphosate is not considered to be a carcinogen, mutagen or teratogen. In addition to glyphosate's low toxicity, to further protect populated areas from herbicide exposure, helicopters would be used to apply Rodeo® to increase the accuracy of application and reduce drift into populated areas.

There are some minor acute human health effects, such as skin and eye irritation, to those who may come in to direct contact with the herbicide while mixing, loading, or application. Exposure to glyphosate by applicators would be prevented through the use of appropriate PPE and adherence to the precautions directed on the product label. The aerial spraying would not be conducted if there were a threat of severe weather (e.g. excessive wind and rain).

The major by-products from a phragmites post-treatment prescribed burn are expected to be phosphorus pentoxide, acetonitrile, carbon dioxide and water. None of these compounds are known to be a health threat at the levels that would be generated from a vegetation fire. The prescribed burning would be performed either by certified individuals in the Fort Monroe Fire Department or by a certified contractor under the direction of the Fire Department. Fire Department personnel would determine safety precautions (e.g. weather restrictions).

The pest management procedure with the greatest potential for human health and safety concern would be the aerial spraying of Dibrom® (active ingredient, naled) for mosquito control. Naled, is an organophosphate pesticide and can have acute adverse human health effects depending on exposure concentration. According to the EPA, naled can cause cholinesterase inhibition in humans; that is at high doses, naled like other organophosphates, can overstimulate the nervous system causing nausea, dizziness, or confusion. EPA also states that, "naled can be used for public health mosquito control programs without posing unreasonable risks to the general population when applied according to the label. EPA has estimated the exposure and risks to both adults and children posed by ULV aerial and ground applications of naled. Because of the very small amount of active ingredient released per acre of ground, the estimates found that for all scenarios considered, exposures were hundreds or even thousands of times below an amount that might pose a health concern. These estimates assumed several spraying events over a period of weeks, and also assumed that a toddler would ingest some soil and grass in addition to skin and inhalation exposure (EPA Naled Fact Sheet 2002)." The Proposed Action would entail a very low application rate (approximately two hours of application, three times per year) according to the product label, which ensures an EPA-approved application concentration. Additional measures would be taken to protect the public by notifying identified sensitive individuals in the region prior to application. The public would be notified, by print and electronic media with sufficient time to allow for planning to minimize exposure during pesticide application. Measures such as remaining indoors or making plans to be away from the treatment area during the application process, could be taken.

Exposure to naled by applicators, while mixing, loading or spraying would be the greatest human health risk, but by using enclosed aircraft cabs and adhering to safe product handling procedures listed on the product label and MSDS would minimize these potential exposure hazards. Naled is a skin irritant, eye irritant and may cause allergic skin reactions after prolonged and repeated contact. Serious toxicological health effects can occur in humans, if exposed to high concentrations and under prolonged duration. The risks would be minimized by strict adherence to all precautions set forth on the chemical label and on the MSDS.

B.t.i. is a bacterial insecticide, is not a human pathogen, and the use of currently registered products containing *Bacillus thuringiensis* in accordance with approved labeling will not pose unreasonable risks or adverse effects to humans or the environment (EPA, Re-registration Eligibility Decision Document, *Bacillus thuringiensis*, 1998). Therefore, the Proposed Action would not have a significant effect on human health and safety.

4.1.2 No Action

It is expected that the overall usage of chemical pesticides would be greater under the No Action Alternative than under the Proposed Action. This would increase the potential for human health and safety impacts from pest management operations. In addition, the No Action Alternative does not provide Fort Monroe with the option to control a disease vector mosquito infestation when ground control measures are inadequate. Intense mosquito activity can be a nuisance, but a more significant consequence of some mosquito bites is transmission of serious diseases such as malaria, dengue fever and several forms of encephalitis. The West Nile Virus, which is spread by the bite of infected mosquitoes and can cause encephalitis or meningitis, has been identified in Virginia since 2002. Therefore, the potential for human health and safety impacts would be greater under the No Action Alternative than the Proposed Action.

4.2 Air Quality

This section analyzes the potential for impacts to air quality resulting from implementation of the Proposed Action and the No Action Alternative. Title I of the federal CAA, General Conformity

Rule refers to the process of evaluating federal plans, programs, and projects to determine and demonstrate that they meet State Implementation Plan air emission goals towards meeting NAAQS. Federal agencies must initially assess if an action is subject to the Conformity Rule (Applicability Analysis) and then if the action conforms to an applicable SIP (Conformity Determination). The General Conformity Rule applies to federal actions occurring in non-attainment or maintenance areas for NAAQS and would; therefore, apply to the implementation of the IPMP, since both Fort Monroe and Big Bethel Reservoir are in a nonattainment area for the 8-hour ozone standard. An additional requirement for determining if a federal action is subject to the General Conformity Rule is if total direct and indirect (net) emissions are equal to or greater than the specified emission rates (de minimis emissions) for any criteria pollutant or precursor in a non-attainment or maintenance area.

4.2.1 Proposed Action

The Proposed Action of IPMP implementation will produce air emissions primarily from the application of VOC-containing pesticides. Application of VOC-containing pesticides for the purpose of controlling real property, household and stored product pests, for example, is already conducted at Fort Monroe, though not coordinated under an integrated pest management plan. With implementation of the IPMP, there will be a decrease in the use of chemical pesticides overall from that seen in the No Action Alternative, since integration of non-chemical pest control methods is a major goal of the IPMP.

Pest control activities proposed in the IPMP that are not currently conducted are the aerial application of pesticides for the control of mosquitoes and phragmites. With regard to mosquito control, the product label-recommended ultra low volume (ULV) aerial dispersal rate for naled generates droplets, which are between 10 and 40 microns. Depending on the climatological conditions, these droplets settle to the earth in a matter of a few hours. According to a 1998 EPA Memorandum, naled degrades rapidly in the presence of sunlight and diffuses in the atmosphere quickly. There would also be temporary increases in VOC and NO_x emissions (from aircraft engine) and volatilization of naled within the proposed treatment area as a result of the Proposed Action.

It is recognized that ULV sprays can be inhaled by humans and other vertebrates and for this reason, residents within the treatment area as well as residents in the surrounding vicinity would be notified of spray timing, in order to minimize undue inhalation exposure. Care would be taken by the applicators to avoid drift into non-target areas by only spraying when wind speeds are below 8 miles per hour and not blowing in the direction of non-target areas.

The spray droplets of the wettable powder formulation *B.t.i.*, at the recommended rate of 6-12 ounces in 1/4 to 10 gallons of water per acre would settle to the water surface within minutes of application, and would, therefore, only transiently affect the quality of the immediate air space. In addition, aerial application of naled and *B.t.i.* will not exceed three applications per season (May – October).

With respect to the control of phragmites, aerial application of herbicide and post-treatment burning would degrade air quality temporarily due to helicopter internal combustion engine emissions, minimal volatilization of glyphosate, and air emissions from burning of phragmites. This air quality degradation would not be expected to be significant considering the small volume of herbicide applied; and the small area (approximately 5 acres) and duration (2 hours maximum) of the application. Since glyphosate and the non-ionic surfactant recommended for use with Rodeo® do not readily evaporate, there will be a minor impact to air quality in the treatment area during and after the application. The by-products from a prescribed burn of

treated phragmites are phosphorus pentoxide, acetonitrile, carbon dioxide and water. None of these compounds are known to be a health threat at the levels generated from a vegetation fire.

In summary, the aerial application of Naled and *B.t.i.* for the control of mosquito disease vectors would only temporarily affect the local air quality and would not exceed local *de minimis* thresholds (100 tons VOC or NOx/yr) for air emissions. Both materials settle to the ground, water, or vegetative substrate, within hours, where they begin to biodegrade and hydrolyze. Emissions from the aerial application of glyphosate, the helicopter engine and prescribed burn are negligible compared to post and regional emissions that are below the 100 tons per year *de minimis* federal conformity thresholds for NOx and VOCs. In addition, measures would be taken to ensure that the impact to local air quality would be limited by applying the product following label instructions as well as EPA and DEQ recommended climatological conditions to limit drift, volatilization, and low level atmospheric ozone.

Therefore, this Proposed Action would be exempt from the General Conformity Rule Determination requirements and no significant effects to air quality would result from the Proposed Action.

4.2.2 No Action

Since it is expected that the overall usage of chemical pesticides would decrease under the Proposed Action, adherence to current pest management practices under the No Action Alternative would result in continued elevated levels of chemical pesticide usage. Thus, the No Action Alternative would result in a greater potential for adverse effects on air quality than the Proposed Action.

4.3 Noise

This section analyzes the potential for impacts from noise pollution resulting from implementation of the Proposed Action and the No Action Alternative.

4.3.1 Proposed Action

The only sources of noise associated with this Proposed Action would be that caused by 1) the shooting of carbide cannons to disturb roosting habits of pest birds, such as pigeons and starlings, and 2) the over flight of aircraft during pesticide application, particularly the low level flying of helicopters during application of herbicide for the control of phragmites. The shooting of carbide cannons to deter the roosting of pest birds is a practice that already occurs at Fort Monroe. The level of noise associated with this activity under the Proposed Action would be the same as that under the No Action Alternative.

The Proposed Action will have only a temporary effect on noise quality from low-level flying aircraft, since applications will not exceed three per year for mosquito control and one per year for phragmites management. The duration of noise exposure will be minimal (no more than two hours per application). No significant effects to noise quality are expected from the Proposed Action due to the infrequent and short duration of aircraft flights associated with the implementation of the IPMP.

4.3.2 No Action

Under the No Action Alternative there would be no change in noise levels generated by pest control methods from those currently being conducted at Fort Monroe and Big Bethel Reservoir.

4.4 Water Resources

4.4.1 Proposed Action

Of pest control methods, it is the use of chemical pesticides that has the greatest potential for impact on water resources, primarily due to storm water runoff. However, with the implementation of integrated pest management techniques, such as the addition and fostering of native, disease resistant plants in lieu of grass lawns, the use of chemical pesticides would be minimized and therefore reduce the potential for impacts to water resources. In addition, the IPMP specifically addresses the use of chemicals on water resources, such that, "no pesticides are applied directly to wetlands or water areas unless use in such a site is specifically approved on the label and the proposed application is approved by the Installation Pest Management Coordinator."

Pest control activities proposed in the IPMP that have not previously been conducted would be the aerial application of pesticides for the control of mosquitoes and phragmites. In the proposed concentration and under strict adherence to the label requirements, the naled used for adult mosquito control would have very little impact on water quality (USAF June 1997). Naled is nearly insoluble in water, and under normal circumstances, most of the applied naled (and its major decomposition products) would be degraded within 24 hours of application. Naled would be applied at such a low rate that the potential for runoff to unintentional areas is small. Because of its rapid degradation naled would be unlikely to contaminate ground water by leaching. The B.t.i used for larval mosquito control is a naturally occurring pathogen that biodegrades readily and; therefore, would not negatively affect water quality. B.t.i. is stable in water for more than 30 days, but it settles to the bottom or is consumed by other organisms without ill effects. B.t.i. does not leach into groundwater. Glyphosate (the active ingredient in Rodeo® used for phragmites control) easily dissolves in water and tends to adhere to sediments when released to water. Due to glyphosate's adsorption to soil, the likelihood of it leaching to groundwater is low. Microbes in the soil readily and completely degrade it even under low temperature conditions.

The major by-products from the prescribed burn for the post-treatment of phragmites are phosphorus pentoxide, acetonitrile, carbon dioxide and water. Phosphorus pentoxide does form phosphoric acid in the presence of water. Because the location of the proposed burn areas are above high tide during the spring months when the burns will occur, there is a low possibility of phosphoric acid forming from the phosphorus pentoxide.

4.4.2 No Action

The No Action Alternative would maintain current baseline conditions, and integrated pest management techniques would not be implemented. It is expected that the current overall usage of chemical pesticides is greater than it would be under the Proposed Action. Thus, the No Action Alternative would result in the potential for greater adverse effects on water quality than the implementation of the Proposed Action. In addition, there would be long-term negative impacts if phragmites were not controlled. The ongoing displacement of native species would continue, resulting in a poorly functioning wetland and greater degradation of the aquatic environment.

4.5 Land Use

4.5.1 Proposed Action

No significant effects to land use are expected from the Proposed Action.

4.5.2 No Action

Under the No Action Alternative there would be no change in land use at Fort Monroe and Big Bethel Reservoir.

4.6 Geology and Soils

4.6.1 Proposed Action

The Proposed Action would have no effect on the geology, and there would be only minor and limited impact to soils. During localized application of chemical pesticides, the impact on soils would be minimized by adherence to the label instructions. The aerial application of Rodeo® for the control of phragmites would have a minor impact on the soil for a short period of time, less than four months (Langley AFB, 2001), after the herbicide is applied. The active ingredient, glyphosate, would be adsorbed into the soil and strongly bound by soil particles; so it would not be absorbed from the soil by plants. Glyphosate remains unchanged in the soil for varying lengths of time, from 3 to 130 days. It would degrade and could be further broken down by soil microorganisms. It has no known effect on soil microorganisms. The naled used for control of adult mosquito populations has a half-life in soil of less than eight hours and would be undetectable after one day under either aerobic or anaerobic conditions. B.t.i. is moderately persistent in soil. Its half-life in suitable conditions is about four months. B.t.i. spores are released into the soil from decomposing dead insects after they have been killed by it. B.t.i. is rapidly inactivated in soils that have a pH below 5.1.

4.6.2 No Action

The No Action Alternative would cause no change to geology or soils from the current baseline conditions.

4.7 Hazardous Materials and Hazardous Waste Management

This section analyzes the potential for impacts from hazardous materials and hazardous waste resulting from implementation of the Proposed Action and the No Action Alternative.

4.7.1 Hazardous Materials

4.7.1.1 Proposed Action

With implementation of the IPMP, there is expected to be an overall decrease in the use of chemical pesticides and; therefore, a decrease in the use of hazardous materials at Fort Monroe. Currently, all pesticides are stored and managed at the Fort Monroe Entomology Office. Pesticides used for mosquito and phragmites treatment would be provided by Fort Monroe and loaded on aircraft for aerial application at Langley AFB airfield. No significant effects to hazardous materials are expected from the Proposed Action.

4.7.1.2 No Action

The No Action Alternative would maintain current baseline conditions, and integrated pest management techniques would not be implemented. It is expected that the current overall usage of chemical pesticides is greater than it would be under the Proposed Action. Thus, the No Action Alternative would result in the potential for greater adverse effects on hazardous materials usage than the implementation of the Proposed Action.

4.7.2 Hazardous Wastes

4.7.2.1 Proposed Action

Since a decrease in use of hazardous materials is expected with the implementation of the IPMP, a respective decrease in the generation of hazardous waste is expected. No significant effects to hazardous waste are expected from the Proposed Action.

4.7.2.2 No Action

It is expected that the current hazardous waste generation is greater than it would be under the Proposed Action. Thus, the No Action Alternative would result in greater potential for adverse effects on hazardous waste generation than the Proposed Action.

4.8 Coastal Zone, Wetlands, and Floodplains

4.8.1 Proposed Action

Under Virginia's Coastal Resources Management Program (VCP), Fort Monroe is required to determine whether coastal effects of a proposed activity are reasonably foreseeable. Due to an anticipated reduction in chemical pesticide usage, the employment of an integrated pest management approach at Fort Monroe would decrease potential environmental impacts within the Virginia coastal zone. The aerial spraying of naled and B.t.i. for mosquito control is consistent with the provisions of VCP, and would not have a significant impact on the coastal zone. Aerial spraying in the surrounding Virginia tidewater region has received approval under VCP (USAF, 1997). Aerial spraying to eradicate phragmites in the coastal zone does not impact or trigger the enforceable regulatory programs under VCP, and would have a positive impact on the coastal zone (Langley AFB, 2001). Fort Monroe will submit a consistency determination to state and local agencies for a 60-day review and comment period.

No activities under the Proposed Action would negatively impact wetlands or floodplains. The application of chemical pesticides would decrease with implementation of an integrated pest management approach. In addition the IPMP prohibits the application of pesticides directly to wetlands or water areas unless use in such a site is specifically approved on the label and the proposed application is approved by the Installation Pest Management Coordinator. There would be no significant impact to the water quality in wetland areas sprayed for mosquito control, because naled degrades quickly, and B.t.i. is an organic agent that is degraded quickly and can be safely consumed by aquatic organisms, the wetlands would not be negatively impacted.

The aerial spraying of Rodeo® (glyphosate) herbicide to reduce phragmites would have a significant positive benefit to the targeted wetlands by restoring indigenous riparian buffer species. This would improve the structure and thereby function of the wetlands in reducing storm water runoff, reducing soil erosion, increasing the filtration of storm water, enhancing the shoreline, and improving the habitat of both aquatic and terrestrial species. Improved wetlands would promote the filtering of excess nutrients, toxins and particulate matter out of the surface water. The positive impact of wetland restoration and improvement contributes toward the fulfillment of EPA's Chesapeake Bay Program Riparian Buffer Initiative, one of Fort Monroe's primary INRMP goals.

4.8.2 No Action

The No Action Alternative would maintain current baseline conditions, integrated pest management techniques and aerial spraying of herbicides and post-treatment burning would not be implemented for the eradication of phragmites. It is expected that the overall usage of chemical pesticides is greater under the No Action Alternative than it would be under the Proposed Action. Thus, the No Action Alternative would result in the potential for greater adverse effects on the coastal zone, wetlands, and floodplain environment than the implementation of the Proposed Action. There would also be long-term negative effects. Without effective phragmites control, the species would continue to propagate and eventually displace all native plant species. Alteration of marshland by this species would continue to reduce tidal

action and soil moisture salinity and lower water tables. It would also threaten wildlife due to the change in structure and function of this diverse marsh system.

4.9 Biological Resources

4.9.1 Terrestrial Communities (Flora and Fauna)

4.9.1.1 Proposed Action

Under the Proposed Action, the pest control method with the greatest potential impact on non-target species is the application of pesticides, including insecticides, fungicides and herbicides. Ground application of pesticides, currently conducted at Fort Monroe though not under an IPMP, has little impact on non-target species, such as humans, beneficial insects, birds, fish, mammals and other species. This is because ground application of pesticides is confined to discrete locations in a controlled manner that significantly limits or eliminates exposure of non-target species. Under the Proposed Action, the IPMP would reduce the use of pesticides through the use of ecologically sensitive pest control methods, and thereby further limit the exposure of non-target species to pesticides. For example, through the increased planting of native, disease resistant plant species, the need for pesticide use will decrease.

Aerial application of naled (Dibrom®) and *B.t.i.* would target marsh and wet areas where mosquitoes breed. In addition to adult flying and resting mosquitoes that are controlled by naled, some mortality would be seen in bees, wasps, flies, dragonflies, damselflies, butterflies, and moths, which come in contact with naled. This includes neutral or beneficial species, as well as, pest species. An added control benefit would be seen in the control of non-target pest species such as; biting midges, deer flies, horse flies, stable flies, black flies, and filth flies. However, bees foraging at the time of application would be killed. Beekeepers living near the base would be notified prior to treatment to take protective measures. Timing the proposed application to as close to sunset as possible should reduce mortality of foragers, not only in cultivated hives but also on wild colonies. Hidden/protected terrestrial and aquatic insects would, for the most part, remain unharmed due to the rapid degradability and non-residual nature of naled.

Birds and mammals would be exposed to naled through the consumption of insect and plant food material containing naled residues and through direct exposure during application. Acute risks to birds and mammals are not a concern and chronic risk to birds and mammals is not a major concern based upon the the limited number (3 per season) and short duration (2 hours maximum) of applications, product label application rates; and rapid breakdown and low persistence of naled (EPA Naled Summary, October 1999). As an added precaution, the general public would be notified by Fort Monroe's DPW/L so that pets and livestock may be moved inside prior to any aerial spraying. It is not anticipated that insectivorous predators (i.e., insectivorous birds) would be negatively impacted, due to the continued availability of unaffected insect prey. However, if insects affected by naled were ingested, naled and biodegradates, dichlorvos and DCA have a low toxicity and low bioaccumulation potential (EPA Memorandum, Revised Environmental Fate and Ecological Effects of Naled, 1997).

With regard to *B.t.i.* aerial application affect on non-target insects, such as other non-culicid Diptera (true flies, midges) with aquatic life forms would likely be affected by ingestion of the *B.t.i.* larvicide. The proposed limit of no more than three applications per season would allow populations of the small number of affected non-target taxa to recover. *B.t.i.* would not affect wild or cultivated bee colonies and notification of beekeepers, therefore, would not be mandatory for *B.t.i.* treatment only.

The aerial application of glyphosate (Rodeo®) for the control of invasive plant species, phragmites, may injure or kill beneficial plants. Desirable native species are somewhat

protected from the herbicide spray by the thick canopy of phragmites preventing the spray from reaching the understory vegetation. Timing of the herbicide application is critical for minimizing the impact on beneficial plants. Glyphosate application must be done when most of the native species are dying back and dormant but while the phragmites is still actively photosynthesizing. Research has shown these conditions exist during October to November (Ailstock 1999). According to a 2003 USFWS Floral Survey at Fort Monroe, "it is estimated that three to five acres of Phragmites exist along the high-marsh/upland interface with Dog Beach and is invading areas within the scrub/shrub woodland habitat, as well (Lingenfelser et al., 2003)." The Proposed Action may have a temporary negative impact on native plant species, but by eliminating competition for resources from phragmites, native plants will then be able to flourish, which will benefit all species that rely upon the wetlands habitat.

No significant effects to non-target terrestrial biological resources are expected from the Proposed Action, with the implementation of aerial application mitigation measures. In addition, the Proposed Action will de-emphasize the use of pesticides, integrating more pest control methods that are friendly to non-target terrestrial plant and animal species.

4.9.1.2 No Action

It is expected that pesticide use would be greater overall under the No Action Alternative compared to that under the Proposed Action. The No Action Alternative would result in greater potential for adverse effects on non-target terrestrial biological resources compared to the Proposed Action.

4.9.2 Marine and Freshwater Aquatic Communities

4.9.2.1 Proposed Action

Mosquitoes breed in estuarine or freshwater habitats. Phragmites is found on Fort Monroe in upland areas adjacent to estuarine salt marshes. Therefore, aerial spraying for mosquitoes and phragmites would take place in or adjacent to marine and freshwater areas. With respect to adult mosquito control, acute and chronic risks to freshwater and estuarine/marine fish are not expected from aerial application of naled (EPA Naled Summary, 1999). There is potential for acute and some potential for chronic risks to freshwater invertebrates from all major uses of naled. (EPA Naled Summary, 1999). All evidence indicates that invertebrate populations can recover in short order due to naled's low persistence and degradability. As an added precaution, the number of sprays would be limited to no more than three per season, to further limit the pesticide burden that may be experienced by the ecosystem.

A study examining the non-target effects of *B.t.i.* on stream invertebrate communities and fish (Merritt 1989), found no significant effects. Another study (Lee 1989) revealed that *B.t.i.* was less toxic to non-target fish (*Fundulus heteroclitus*) than four other chemical larvicides. A point to consider when weighing the effects of reducing mosquito numbers in a marsh ecosystem is that competing non-target "non pest" organisms can be expected to fill the ecological niche normally occupied by "pest" mosquito larvae and could, in some cases, benefit ecologically from intervention.

Because Rodeo® is an herbicide and its mode of action (preventing plants from producing an essential amino acid) does not occur in animals, it has no known effect on fish, and is non-toxic to aquatic invertebrates. It does not bioaccumulate in fish, or invertebrates and thus does not become part of the food chain. There will be no impact to non-photosynthesizing organisms. With regard to the control of phragmites, the Proposed Action would have positive impacts on aquatic communities that are supported by wetland habitats, including improved water quality through removal of excess nutrients by native plants and increased biodiversity and ecosystem

stability within the native habitat. In the unlikely event of a chemical application fish kill, the VA Department of Environmental Quality Tidewater Regional Office will be immediately contacted.

No significant effects to marine and freshwater resources are expected from the Proposed Action.

4.9.2.2 No Action

It is expected that pesticide use would be greater overall under the No Action Alternative compared to that under the Proposed Action. The No Action Alternative would not provide the means to control for phragmites, resulting in the continued decline of native wetland plant species and the aquatic communities that thrive in this environment. Thus, the No Action Alternative has a greater potential to negatively impact aquatic communities compared to the Proposed Action.

4.9.3 Threatened and Endangered, Special Status Communities

4.9.3.1 Proposed Action

Species listed, proposed for listing, or candidates for listing as threatened and endangered in accordance with the federal Endangered Species Act (ESA) or state listed species are not likely to be adversely affected by the Proposed Action because none have been located at Fort Monroe. Should any of these species become present their exposure to the pesticide would be short term. However, aerial spraying of naled may result in mortality in all of the four species of listed rare moths. For sensitive areas, such as a heron rookery or other migratory bird nesting areas, or should federal or state protected species be discovered at Fort Monroe, such as regionally occurring bald eagles or piping plovers, pesticide spray personnel would be informed of exact locations of nesting sites. Pesticide spray personnel would also be informed of the locations of the four state listed moths if they are found to occur. Bird nesting sites and live oaks that harbor the larvae of the rare moths would not be threatened and over flights of active nests and moth harboring live oaks would not occur at less than 750 meters to avoid disturbance.

4.9.3.2 No Action

It is expected that pesticide use would be greater overall under the No Action Alternative compared to that under the Proposed Action. The No Action Alternative would not provide the means to control for phragmites, resulting in the continued decline of native wetland plant species and the aquatic communities that thrive in this environment. Thus, the No Action Alternative has a greater potential to negatively impact threatened and endangered species compared to the Proposed Action.

4.10 Cultural Resources

4.10.1 Proposed Action

It is Fort Monroe policy that all actions and projects that have the potential to affect cultural resources must be closely coordinated with the Virginia SHPO and the ACHP. Based upon the available information, no significant positive or negative impacts are expected on cultural resources due to the Proposed Action. There are no pest control measures or techniques in the IPMP that would affect any architectural, archeological or traditional cultural resources.

4.10.2 No Action

Under the No Action Alternative the current baseline conditions would be maintained, and no cultural resources would be impacted.

4.11 Socioeconomic Environment

No significant effects on socioeconomics are expected from the Proposed Action or No Action Alternative.

4.12 Environmental Justice

4.12.1 Proposed Action

There are no low-income or minority communities within the area of the Proposed Action, so no individuals would experience a disproportionate health, safety, or environmental impact (e.g. effects due to noise, hazardous materials or wastes, air/water pollution) from the implementation of the Proposed Action.

The Army observes all possible precautions to ensure that its operations do not result in harm or injury to children that may be present at family housing, medical facilities, places of religious worship, or childcare centers. The IPMP notes that special care would be given when pesticides are applied in the child development center, in patient areas of the health clinic, or in family quarters where infants are present. Pesticide label instructions would be strictly followed. In addition, herbicides would not be used to control weeds at the Child Development Center or other areas where children play. Because the IPMP minimizes the use of chemicals and provides additional accommodation for the presence of children when performing chemical control measures, the Proposed Action would not negatively impact children.

4.12.2 No Action

The No Action Alternative would maintain current baseline conditions. It is expected that the overall usage of chemical pesticides would be greater under the No Action Alternative than under the Proposed Action. Thus, the No Action Alternative would result in the potential for greater adverse effects on children or other individuals than the implementation of the Proposed Action.

5.0 CUMULATIVE EFFECTS AND IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

5.1 Cumulative Effects

Cumulative effects on environmental resources result from incremental effects of proposed actions, when combined with other past, present, and reasonably foreseeable future projects in the area. Cumulative effects can result from minor, but collectively substantial, actions undertaken over a period of time by various agencies (Federal, state, and local) or individuals. In accordance with NEPA, a discussion of cumulative effects resulting from projects that are proposed, under construction, recently completed, or anticipated to be implemented in the near future is required. The CEQ guidance document, *Considering Cumulative Effects under the National Environmental Policy Act* (1997), affirms this requirement, stating that the first steps in assessing cumulative effects involve defining the scope of the other actions and their interrelationship with the Proposed Action. The scope must consider geographic and temporal overlaps among the proposed action and other actions. It must also evaluate the nature of interactions among these actions.

The scope of this cumulative effect analysis involves both the geographic extents of the effects and the time frame in which the effects could be expected to occur. For this EA the Region of Influence (ROI) includes the affected area of Fort Monroe and the Big Bethel Reservoir and natural resources and communities in the vicinity of the Proposed Action. Only actions occurring within or adjacent to the ROI are considered in the cumulative effects analysis.

5.1.1 Past, Present, and Reasonably Foreseeable Actions

Fort Monroe's mission as stated in Section 1.0 is to provide quality base operations support to DoD personnel and activities through facilities, infrastructure, well-being and force protection. Fort Monroe as an active military installation must respond to changing defense policies and current threats, which may require modifications in mission, facility operations and infrastructure. The post, like any other major institution (e.g., university, industrial complex), requires new construction, facility improvements, infrastructure upgrades, and maintenance and repairs.

5.1.2 Past and Present Actions

During the timeframe for the Proposed Action, Fort Monroe has proposed other actions that are independent of the proposed IPMP implementation, and these other actions would be implemented irrespective of a decision on the Proposed Action.

In 2003, Fort Monroe initiated a project to transfer responsibility for providing housing and ancillary supporting facilities to a private developer. Redevelopment would occur at Wherry housing areas and rehabilitation would occur at historic housing, as well as some possible development in currently undeveloped areas adjacent to these housing complexes for support activities. This action was determined to have minor adverse long-term effects on biological resources and cultural resources, as well as short-term effects on air quality, noise, soils, water resources, protection of children, transportation, utilities, and hazardous substances. There could be some cumulative short-term effects on air quality, and water resources, if construction associated with the housing project coincided with aerial spraying events. However, the effects from each action are extremely small, and the combined impact would remain minor. The Army has since decided not to transfer housing to a private developer, rather the actions listed above will be performed by the Army.

5.1.3 Reasonably Foreseeable Future Actions

At the same time, Fort Monroe's Natural Resources Management Program is implementing strategies of proactive stewardship for Fort Monroe and Big Bethel Reservoir lands. Natural resource management efforts that would occur at the same time as the Proposed Action would be plantings of native species, including native riparian buffer species. As documented in the May 2004 draft Fort Monroe Strategic Plan, future activities also include repairing the Dog Beach dunes, repairing the Mill Creek Berm, extending Fort Monroe's existing nature trail, expanding the ecological habitat at Mill Creek, and enhancing the moat water quality.

Other potential stewardship activities could be to continue to control and eradicate phragmites on other tidal wetland areas on post. These other areas are the same habitat type (tidal marsh) with like functions and structures; methods for controlling phragmites would be the same unless new technology emerges.

5.1.4 Analysis of Cumulative Effects of the Proposed Action

Fort Monroe, as a member of a greater community, is obligated to protect the health and welfare of its residents and surrounding populations. Consistent with this is the management of disease vector pests that originate on Fort Monroe and Big Bethel Reservoir property. Now, and in the past, Fort Monroe has relied upon ground application methods for mosquito population control. As requirements change due to the increased incidence of mosquito-borne diseases, such as West Nile Virus, pest control methods have needed to change to meet the new requirements. Hence, the proposal to aerially apply pesticides at Fort Monroe and the Big Bethel Reservoir, a practice conducted in all surrounding cities, which will serve to better protect populations from mosquito-borne diseases.

Fort Monroe, as a steward of the environment, is obligated to protect garrison and surrounding natural resources whenever possible. Now and in the past, spot treatment pesticide application to control undesirable vegetation, such as phragmites, has proved ineffective. The aerial application of herbicide would be a more effective method of phragmites management and would restore the native salt marsh ecosystem at Fort Monroe, which occupies a unique location on the ecologically important Chesapeake Bay.

5.2 Irreversible and Irretrievable Commitment of Resources

The NEPA requires that environmental analysis include identification of "...any irreversible or irretrievable commitments of resources that would be involved in the Proposed Action should it be implemented." Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effects that the uses of these resources have on future generations. Irreversible effects primarily result from the use or destruction of a specific resource (e.g., energy and minerals) that cannot be replaced within a reasonable timeframe. Irretrievable resource commitments involve the loss in value of an affected resource that can not be restored as a result of the action (e.g., extinction of a threatened or endangered species or the disturbance of a cultural site).

For the Proposed Action, the commitment of labor, vehicle/aircraft fuel and pesticides are irreversible and irretrievable. However, the impact of the commitment of these resources would be negligible. The use of these resources would have no effects on future generations and would not result in the destruction of an irreplaceable resource.

6.0 CONCLUSION

This Proposed Action to implement the IPMP is not likely to have a significant effect, either individually or cumulatively, upon the human or natural environment. This project is fully consistent with the VCP. Projects are consistent with the VCP upon receipt of all applicable permits or approvals listed under the VCP enforceable programs. These programs include the management of fisheries, subaqueous lands, wetlands, dunes and coastal lands as well as non-point source pollution control, point source pollution control, shoreline sanitation, and air pollution control.

Implementation of the Proposed Action would result in a combination of long-term and short-term adverse and beneficial effects. The primary impacts would be the long-term beneficial effects on the wetlands due to the eradication of phragmites, and improved health and safety of the community with the control of disease vectors. There would also be a benefit to the hazardous materials and hazardous waste management programs because of a reduction in chemical pesticides.

The Proposed Action would cause short-term adverse but minor impacts on air quality, the noise environment, water resources, and soils. Aerial pesticide application could have short-term adverse effects on the health of sensitive individuals, but mitigation efforts (e.g., public notification) would minimize these impacts. There would be adverse effects on biological resources (e.g., invertebrates harmed by aerial pesticide spraying) in the short-term, but there would also be long-term benefits to biological resources (e.g., ecosystem improvement through control of phragmites and reduction of chemical use).

There would be no effect on cultural resources, land use and the socioeconomic environment. There would be no environmental justice concerns.

Based on this analysis, it has been determined that implementation of the Proposed Action would have no significant direct or indirect impacts on the quality of the natural or human environment. Because no significant impacts would result from implementation of the Proposed Action, an Environmental Impact Statement is not required and will not be prepared. Instead Fort Monroe has prepared a Finding of No Significant Impact in accordance with the Army's NEPA regulations.

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10.0 APPENDICES

APPENDIX A: FORT MONROE AERIAL APPLICATION OF PESTICIDES STATEMENT OF NEED

MEMORANDUM FOR FORT MONROE DPW/L

FROM: 757 AS/DOS

SUBJECT: Aerial Spray Statement of Need - Fort Monroe, Virginia

1. Capt Donald A. Teig visited Fort Monroe on 5 April 1999 to validate the base's aerial spray requirements as required by AFI 32-1074, Aerial Application of Pesticides and DoD Instruction 4150.7, The DoD Pest Management Program. All appropriate programs and documents were reviewed. Base and local mosquito control organizations were consulted on the aerial spray program.
2. KEY CONTACTS:
 - a. Ft Monroe:
Jennifer Guerrero, Environmental Director
Sheldon Cuffee, Pest Control
Maj. Renee Jefferson, Preventive Medicine Officer
 - b. Local Community Mosquito Control Agencies:
Joe Kertez, Hampton Mosquito Control
Jim Rindflesh, York County Mosquito Control
3. Fort Monroe and the Bethel Reservoir Recreation Area were validated for aerial application of pesticides to ensure better protection of Fort Monroe and Langley AFB's Bethel Housing area during mosquito-borne disease epidemics. The entire area would only be treated in the event of a mosquito-borne disease outbreak. Attached is the Aerial Application of Pesticides Statement of Need for Fort Monroe.
4. For additional information, contact us at DSN 346-1111/1412 or visit our web site at <http://wwwmil.acc.af.mil/ce/ceo/ceo/AERIALSPRAY/index.htm>.

DONALD A. TEIG, Capt, USAFR
Pest Management Professional

Attachment:
Aerial Application Statement of Need – Fort Monroe

cc:
HQ TRADOC, Ft. Monroe, VA
AEC, Aberdeen Proving Ground, MD

**AERIAL APPLICATION OF PESTICIDES STATEMENT OF NEED
PREPARED BY
910 AW AERIAL SPRAY
YOUNGSTOWN AIR RESERVE STATION, OHIO**

5 APRIL 1999

INSTALLATION: Fort Monroe, Virginia

PURPOSE: Validates requirements for aerial dispersal of insecticides
for control adult and larval mosquitoes

DATES OF SURVEY: 5 April 1999

AUTHORITY: DoD 4150.7-i, The DoD Pest Management Program
AFI 32-1074, Air Force Civil Engineer Pest Management
AR 420-76, Army Facilities Engineering Pest Management

ENTOMOLOGIST: Donald A. Teig, Capt, USAFR

1. TARGET PEST(s) AND STAGES TO BE CONTROLLED. Larval and adult mosquitoes. Primary target species to be controlled is *Aedes sollicitans*, which breeds in salt marshes; *Culex pipiens* which breeds in containers with high organic matter content; *Anopheles crucians/bradleyi*, which breeds in salt marshes, along lake margins, and in freshwater swamps; and *Aedes taeniorhynchus* which breeds in salt marshes. *Aedes sollicitans*, is a primary vector of eastern equine encephalitis (EEE) virus. *Culex pipiens*, is a vector of St Louis Encephalitis (SLE), and Venezuelan Equine Encephalitis (VEE). *Anopheles crucians/bradleyi* is a secondary vector of malaria, VEE, and EEE. *Aedes taeniorhynchus* is a primary vector of VEE. *Aedes albopictus*, the introduced Asian tiger mosquito is widespread in the area and capable of transmitting EEE, dengue, and yellow fever. This is a day-time biter, which has become widespread across the Virginia peninsula over the last 5 years.

a. DISEASE TRANSMISSION. Efficient mosquito vectors of encephalitis, malaria, dengue, and canine heartworm are present on or around Fort Monroe. Human cases of EEE, St. Louis encephalitis (SLE), and imported human cases of malaria were reported from Virginia during the 1970's, 1980's, and 1990's. One human death from EEE occurred in the City of Portsmouth during 1998, while several equine cases of EEE have been documented from the City of Chesapeake, Virginia's Eastern Shore, and North Carolina over the last decade. Malaria has been documented sporadically from travelers and military personnel who have contracted malaria while overseas. Dog heartworm, *Dirofilaria immitis*, a mosquito-borne filarial parasite of canines which on occasion has been found in man, is prevalent throughout coastal Virginia.

b. EFFECT OF INFESTATION ON MORALE AND EFFICIENCY. The efficiency of troops in training, military police, fire department employees, and others who work outdoors may be adversely affected when mosquito numbers are high. While an individual's predisposition to mosquito bites vary, morale and productivity are generally adversely impacted during periods of high mosquito activity. Adverse psychological reactions can be a factor in some individuals. Use of recreation facilities such as athletic fields, playgrounds, and picnic areas may decline at times due to intense mosquito activity. Such restrictions reduce productivity and have a negative effect on the morale

of assigned personnel, their dependents, transient personnel, guests and residents of civilian communities.

c. DIRECT IMPORTANCE OF PROTECTION IN MAINTAINING INSTALLATION'S OPERATIONAL CAPABILITIES. Severe mosquito annoyance can reduce the mental concentration and overall productivity of aircraft maintenance crews, military police, and others who are required to work or train outdoors. An outbreak of a mosquito-borne disease among base personnel could seriously degrade mission-essential operations.

2. RECOMMENDED TIMING OF APPLICATION. The heaviest mosquito infestations occur in the Fort Monroe area from May through October. To minimize the areas to be sprayed and number of times to be sprayed each year, spray will only occur in off base areas when the Lower Peninsula Mosquito Control Council recommends a time and integrated area to be sprayed because an impending infestation cannot be managed by ground control measures. Aerial spray determinations are based upon the following factors:

- a. Regional human and animal illness and mortality reports attributable to mosquito-borne disease(s);
- b. The mosquito population potential as influenced by environmental and climatic conditions (i.e. tidal influence affecting salt marsh mosquito brood hatch)
 - light trap counts
 - larval dipping
 - landing rates
 - human complaints

Aerial application of pesticides will not exceed three applications per season, using the microbial larvicide *Bacillus thuringiensis* subspecies *israeliensis* (Bti), and will not exceed three applications per season of the adulticide naled. Aerial spray operations will normally be initiated not earlier than three hours prior to sunset. Aerial spray requests will be coordinated with the TRADOC Command Pest Management Professional, Fort Monroe Entomology Section and the Chief, Preventive Medicine Services, Fort Eustis.

3. TREATMENT AREA. The proposed area to be validated for aerial application is Fort Monroe and the Bethel Recreation Area (Atch 1-2). Fort Monroe is located at __North Latitude and __West Longitude on the lower Virginia peninsula.

4. ACREAGE AND DESCRIPTION OF SPRAY AND SURROUNDING AREA. Topography of lower Virginia peninsula area is mostly flat, with elevations ranging from sea level to 8 feet. Fort Monroe has 568 acres of which a small portion of dog beach is designated wetlands. Bethel Recreation Area has 500 acres, which contains a 266 acre reservoir and is surrounded by wetlands and woods. This recreation area borders Langley AFB's Bethel Housing Area and serves as a major source of mosquito breeding. The Lower Peninsula Mosquito Control Council (with representatives from Newport News, Ft. Monroe, York County, Poquoson, and Hampton) will determine where mosquito hot spots are located on the peninsula to ensure only problem areas are treated. Under most circumstances, only hot spots within this spray area will be treated unless a significant mosquito-borne disease threat is present. Six threatened and 14 endangered species live within a 50-mile radius of Fort Monroe. All environmentally sensitive areas will be identified on the spray map and only sprayed if proper approval is obtained. Apiaries and sensitive individuals have been identified and will be notified by the installation Public Affairs Office prior to any aerial spraying. Outdoor recreation facilities in the Fort Monroe area include athletic fields, playgrounds, picnic grounds, tennis courts, swimming pools, fishing ponds, riding stables, jogging courses, and golf courses.

5. RECOMMENDED PESTICIDES AND APPLICATION RATE. The insecticide Dibrom Concentrate NSN 6840-01-270-9765, 30-gallon drum, EPA Reg. 239-1721-AA) is recommended in aerial application for adult mosquito control. The chemical is a formulation of 85% naled (1, 2-dibromo-2, 2 dichloroethyl dimethyl phosphate) with 15% inert ingredients. The label recommended rate of application is 0.5-1.0 ounces of undiluted Dibrom Concentrate per acre by means of aerial ultra-low-volume (ULV) equipment or a mixture of Dibrom Concentrate and highly aromatic naphtha (HAN). Application will normally use 0.5 ounces of concentrated Dibrom per acre and will never exceed the label maximum rate of 1.0 ounce per acre. If Dibrom Concentrate can not be used due to non-availability or ineffectiveness, another EPA approved alternate insecticide can be selected after consultation with the appropriate state and local authorities and the 910 AW Aerial Spray Branch.

a. ALTERNATE CONTROL MEASURES. The mosquitoes that infest Fort Monroe and Bethel Recreation Area develop primarily in salt marshes or swampy areas on and off base. Some breeding habitat reduction is feasible, but is limited due to the importance of preserving the wetlands habitat. Keeping vegetation cleared from established drainage ditches limits conditions favorable for development of mosquito larvae, and reduce harborage sites for adult mosquitoes. Larvivorous fish, predatory insects, and other natural biological controls are established in base water bodies. Larviciding with the biological larvicide *Bacillus thuringiensis* subspecies *israelensis* in mosquito breeding locations helps reduce overall mosquito numbers. Use of insect repellents and repellent-treated cloth mesh jackets provides some relief to personnel required to work outdoors. Because ground-based ULV mosquito adulticiding is limited to areas on base that are accessible to vehicles, and many of the Fort Monroe mosquitoes originate in salt marshes and other breeding areas off-base, ground-based control efforts could be overwhelmed. Aerial adulticiding is the only practical measure for rapid, large area control of high numbers of pest or vector mosquitoes that prove unmanageable with all available ground-based techniques.

6. POSSIBILITY OF DAMAGE OF BENEFICIAL PLANTS AND ANIMALS. With the insecticide application rates, techniques, and weather constraints adhered to by the USAF Reserve Aerial Spray Branch applicators during the aerial spray activities, minimal to no damage to beneficial organisms or property is anticipated. A detailed discussion of environmental factors will be included in the environmental assessment written for this project. Because US Environmental Protection Agency rulings may prohibit the use of certain pesticides within the range of critical habitat of certain endangered species, a copy of the installation pest management plan should be submitted to the regional USFWS office for review and consultation. If use of aerial spray should prove necessary, the Public Affairs Office should disseminate information to base personnel and the surrounding communities concerning the proposed times of application, areas to be sprayed, the presence of low-flying aircraft, the relatively harmless properties of the pesticide to plants, property, and vertebrate animals, and the fact that apiaries and other sensitive operations should be protected during the aerial application.

7. RECOMMENDED APPLICATOR SOURCE. The 757 Airlift Squadron, Youngstown Air Reserve Base, Ohio, will provide a C-130H aircraft equipped with a Modular Aerial Spray System (MASS) and Differential Global Positioning System (DGPS). This Air Force Reserve unit will provide aircraft, aircrews, and Virginia State certified/DoD certified Entomologists to coordinate and oversee all aerial application of pesticides. Ft. Monroe will be responsible for

providing pesticide. This spray area will be added to the existing spray block for Langley AFB and Hampton.

Donald A. Teig, Capt, USAFR
Pest Management Professional

Attachments:

1. Map of Fort Monroe
2. Map of Bethel Recreation Area

APPENDIX B: MINIMUM THRESHOLD LEVELS REQUIRED FOR ACTION

(from *Environmental Assessment for Aerial Dispersal of Pesticide for Mosquito Control, Langley Air Force Base, Virginia and Vicinity*)

**Table 2.3-1
DECISION MATRIX FOR AERIAL MOSQUITO CONTROL
LANGLEY AFB AND ADJACENT AREAS,¹ 1996**

**Survey Methods and
Treatment Goals: Minimum Threshold Levels Required for Action**

	For Aerial Larval Control; Sample 1 to 3 days prior to proposed spray date (80% - 1st thru 3rd instars)	For Aerial Adult Control; Sample 3 to 7 days prior to proposed spray date (80% - 4th instar and pupae)
	Marshland Larval Counts²	
Immediate goal:		
Disease Vector Control	5/dip	5/dip
Nuisance Control	25/dip	25/dip
Longer-term goal:		
Egg Base Reduction	5/dip	5/dip
(subsequent generations)		

	For Aerial Adult Control Peak Rates Within 6 Days of Proposed Treatment	
	In Marshlands	On Cantonment
Adult Landing Rates³		
Immediate goal:		
Disease Vector Control ⁴	5/minute	1/minute
Nuisance Control ⁵	25/minute	5/minute
Longer-term goal:		
Egg Base Reduction	5/minute	1/minute
(subsequent generations)		

	For Aerial Adult Control Peak Rates Within 5 Days of Proposed Treatment	
	In Marshlands	On Cantonment
Light Trap Counts⁶		
New Jersey Light Traps without CO ₂	Range/Marsh Site Trap Index*	Cantonment Sites Trap Index
Immediate Goal:		
Disease Vector Control	20 females	15 females
Nuisance Control	75"	35"
Longer-term goal:		
Egg Base Reduction	25"	5"
(subsequent generations)		
*Number of collected females/(# traps x # nights)		

Table 2.3-1
DECISION MATRIX FOR AERIAL MOSQUITO CONTROL
LANGLEY AFB AND ADJACENT AREAS, 1996

Complaints These are obtained from key base personnel. They include: Airfield Control, Security Police at Main Gate, Family Housing Mayors, Unit Leaders and Commanders, Senior Leaders, Golf Course Employees, Personnel using the stable and sports fields, and Public Health Personnel. Key personnel shall be solicited to comment on mosquito activity 1 to 3 days prior to aerial spray. Criteria shall be that these personnel consider mosquito populations to be moderate to heavy which, in turn, adversely affects their ability to conduct outdoor activities

Footnotes and Comment:

1 This matrix applies to Langley AFB surveillance and pest management activities. Parallel standards apply to adjacent mosquito breeding/feeding areas of Hampton, Poquoson, Newport News, and York County.

2 On the proposed day of adult spraying, a low larval count is expected because adults have already emerged. Also, adult emergence is synchronous with high tidal flooding starting in March. Adults emerge 10 to 14 days following flooding. larval counts can project adult populations and approximate time of peak adult emergence.

3 On the proposed day of adult spraying, adult emergence should have peaked. Counts should be high or on the decrease as female mosquitoes leave the marshlands seeking blood meals. Landing rates are not used to validate the need for larval control. When fresh-water breeding adult mosquito activity is greatest, only measurements on cantonment are useful.

4 When mosquito populations are judged to be a disease vector problem, as determined by the Lower Peninsula Mosquito Control Advisory Board (LPMCAB), their numbers may be below nuisance levels.

5 On the day of treatment, salt-marsh mosquitoes may not yet be a humanly-perceived problem if they have not yet migrated away from the marshes.

6 On the day of aerial spraying, peak numbers may not be reached because salt marsh mosquitoes have just emerged and have not yet migrated to light trap locations. Prior to spraying there should be some indication that mosquito populations are building. For fresh-water breeding mosquitoes, the light trap is the primary surveillance method used to initiate and terminate adult mosquito control efforts, both aerial and ground based. It should be noted that trap catches are affected by environmental influences such as temperature, wind, rain, moon phase.

Comment: All sampling methods provide a relative index of a biological population that is subject to wide swings in variation. All numbers listed above should be evaluated with a plus or minus 20 percent variation. Most importantly sampling data should indicate trends, specifically increasing populations and peak activity. The consensus of the LPMCAB would be the primary basis for classifying mosquitoes as a disease vector problem and using lower threshold limits.

APPENDIX C: PESTICIDE PRODUCT LABELS AND MATERIAL SAFETY DATA SHEETS



at Docu

**APPENDIX D: AERIAL SPRAY STATEMENT OF NEED FOR CONTROL OF
PHRAGMITES - FORT MONROE, VIRGINIA**



at Docu

**APPENDIX E: COASTAL ZONE MANAGEMENT ACT (CZMA) CONSISTENCY
DETERMINATION FOR THE INTEGRATED PEST MANAGEMENT PLAN FORT
MONROE, VIRGINIA**

**Coastal Zone Management Act (CZMA)
Consistency Determination for the
Integrated Pest Management Plan
Fort Monroe, Virginia**

This document provides the Commonwealth of Virginia with the Fort Monroe Consistency Determination under CZMA section 307(c) (1) and 15 CFR Part 930, subpart C, for the Integrated Pest Management Plan (IPMP) for Fort Monroe, Virginia. The information in this Consistency Determination is provided pursuant to 15 CFR Section 930.39. This activity includes:

[The following paragraphs of text summarize the proposed federal activity. A full description of the proposed activity may be found in Section 2.0 of the Environmental Assessment (EA) of the Integrated Pest Management Plan for Fort Monroe, Virginia; which is incorporated by reference into this Consistency Determination].

Fort Monroe has initiated the National Environmental Policy Act (NEPA) process to consider the environmental impacts of implementing the IPMP and a no action alternative regarding pest management at Fort Monroe.

Fort Monroe proposes to implement the IPMP as the principal guide for conducting its Integrated Pest Management Program. The plan outlines program roles and responsibilities of Fort Monroe personnel; provides an inventory of land and facilities to which the plan applies; provides an annually updated inventory of program pesticides; describes a variety of integrated pest management (IPM) techniques; provides guidance on storage, handling, application, disposal, and sale and distribution of pesticides consistent with regulatory requirements; and considers potential environmental, health and safety issues related to pest control techniques. The purpose of implementing the IPMP is to provide safe, effective, and environmentally sound pest management, which includes the potential use of aerial pesticide spraying for control of mosquitoes and phragmites (common reed). The plan is designed to reduce reliance upon pesticides, to enhance environmental protection, to maximize the use of IPM techniques (i.e., methods of pest control that emphasize non-chemical treatments when possible), and to manage and coordinate pest control efforts. The Fort Monroe IPMP includes prevention, treatment, and management techniques for controlling the following pests:

- disease vector and public health pests (including aerial spraying with naled and *Bacillus thuringiensis* var. *israelensis* (B.t.i.) for mosquito control)
- quarantine pests
- structural pests
- stored product pests
- ornamental plant and turf pests and diseases
- undesirable vegetation (including aerial spraying of glyphosate for phragmites control)
- animal pests
- household pests
- various nuisance pests.

Section 4.0 (Environmental Consequences) of the IPMP EA describes the effects that the implementation of the IPMP would have on the land and water uses and natural resources of Virginia. The table below provides a summary of the applicable enforceable policies of the Virginia Coastal Resources Management Program and the impacts resulting from the Proposed Action.

Applicable Enforceable Policies	Federally Proposed Action's Effect (For more detail refer to analyses found in the Environmental Assessment.)
<p>Fisheries Management</p> <p>The program stresses the conservation and enhancement of finfish and shellfish resources and the promotion of commercial and recreational fisheries to maximize food production and recreational opportunities. This program is administered by the Virginia Marine Resources Commission (MRC) (Code of Virginia § 28.2-200 thru 28.2-713) and the Department of Game and Inland Fisheries (DGIF) (Code of Virginia § 29.1-100 thru 29.1-570).</p> <p>The State Tributyltin Regulatory Program has been added to the Fisheries Management program. The General Assembly amended the Virginia Pesticide Use and Application Act as it related to the possession, sale, or use of marine antifoulant paints containing Tributyltin. The use of Tributyltin in boat paint constitutes a serious threat to important marine animal species. The Tributyltin program monitors boating activities and boat painting activities to ensure compliance with Tributyltin regulations promulgated pursuant to the amendment. The MRC, the DGIF, and Virginia Department of Agriculture Services share enforcement responsibilities (Code of Virginia § 3.1-249.59 thru 3.1-249.62).</p>	<p>NO EFFECT:</p> <p>The proposed project does not propose to build, dump or otherwise trespass upon or over, encroach upon, take or use any material from the beds of the bays, ocean, rivers, streams or creeks within the jurisdiction of Virginia.</p> <p>The aerial application of naled for adult mosquito control could potentially harm freshwater invertebrates, but studies indicate that invertebrate populations can recover quickly due to naled's low persistence and degradability. As an added precaution, the number of sprays would be limited to no more than three per season, to further limit the pesticide burden that may be experienced by the ecosystem.</p> <p>Additionally, no paints containing Tributyltin would be used under the proposed activity.</p> <p>The proposed action would not negatively impact finfish/shellfish resources, or commercial and recreational fisheries.</p>
<p>Subaqueous Lands Management</p> <p>The management program for subaqueous lands establishes conditions for granting or denying permits to use state-owned bottomlands based on considerations of potential effects on marine and fisheries resources, wetlands, adjacent or nearby properties, anticipated public and private benefits, and water quality standards established by the DEQ, Water Division. The program is administered by the MRC (Code of Virginia § 28.2-1200 thru 28.2-1213).</p>	<p>NO EFFECT:</p> <p>No subaqueous land use is proposed under the proposed action. This project involves no encroachments in, on, or over state-owned submerged lands.</p>
<p>Dunes Management</p> <p>Dune protection is carried out pursuant to the Coastal Primary Sand Dune Protection Act and is intended to prevent destruction or alteration of primary dunes. This program is administered by the MRC (Code of Virginia § 28.2-1400 thru 28.2-1420).</p>	<p>NO EFFECT:</p> <p>No permanent alteration of or construction upon any coastal primary sand dune would take place under the proposed action.</p>
<p>Shoreline Sanitation</p> <p>The purpose of this program is to regulate the installation of septic tanks, set standards concerning soil types suitable for septic tanks, and specify minimum distances that tanks must be placed away from streams, rivers, and other waters of the Commonwealth. This program is administered by the Department of Health (Code of Virginia § 32.1-164 thru § 32.1-165).</p>	<p>NO EFFECT:</p> <p>No septic tanks would be used in the proposed action.</p>

<p>Air Pollution Control</p> <p>The program implements the federal Clean Air Act to provide a legally enforceable State Implementation Plan for the attainment and maintenance of the National Ambient Air Quality Standards. This program is administered by the State Air Pollution Control Board (Code of Virginia § 10-1.1300).</p>	<p>NO EFFECT:</p> <p>The aerial application of naled, B.t.i. and glyphosate would temporarily affect the local air quality but would not exceed local <i>de minimis</i> federal conformity thresholds (100 tons VOC or NO_x/yr) for air emissions. Naled and B.t.i. settle from the air within hours, where they begin to biodegrade and hydrolyze. Measures would be taken to ensure that impact to local air quality would be limited by applying under product label, EPA and DEQ recommended climatological conditions to limit drift and volatilization. Therefore, this proposed action would be exempt from the General Conformity Rule Determination requirements and no significant effects to air quality would result from the proposed action.</p>
<p>Wetlands Management</p> <p>The purpose of the wetlands management program is to preserve tidal wetlands, prevent their despoliation, and accommodate economic development in a manner consistent with wetlands preservation. The tidal wetlands program is administered by the VAMRC (Code of Virginia § 28.2-1301 thru § 28.2-1320). The Virginia Water Protection Permit program administered by the DEQ includes protection of wetlands, both tidal and non-tidal. This program is authorized by Code of Virginia § 62.1-44.15.5 and the Water Quality Certification requirements of Section 401 of the Clean Water Act of 1972.</p>	<p>NO EFFECT:</p> <p>No activities under the proposed action would negatively impact wetlands. The aerial spraying of a glyphosate herbicide to reduce phragmites would have a significant positive benefit to the targeted wetlands by restoring indigenous riparian buffer species. This would improve the structure and thereby function of the wetlands in reducing storm water runoff, reducing soil erosion, increasing the filtration of storm water, enhancing the shoreline, and improving the habitat of both aquatic and terrestrial species. There would be no significant impact to the water quality in wetland areas sprayed for mosquito control, because the intended pesticides degrade rapidly.</p>
<p>Non-point Source Pollution Control</p> <p>Virginia's Erosion and Sediment Control Law requires soil-disturbing projects to be designed to reduce soil erosion and to decrease inputs of chemical nutrients and sediments to the Chesapeake Bay, its tributaries, and other rivers and waters of the Commonwealth. This program is administered by the Department of Conservation and Recreation (DCR) (Code of Virginia § 10.1-560 et.seq.).</p> <p>According to the Department of Conservation and Recreation, the following activities are regulated by the Erosion and Sediment Control Law (Virginia Code section 10.1-567) and its implementing regulations if these activities involve 2,500 square feet or more of land disturbance:</p> <ul style="list-style-type: none"> ▪ clearing and grading activities; ▪ installation of staging areas, parking lots, roads, buildings, utilities, or other structures; ▪ soil/dredge spoil areas; ▪ related land conservation activities. 	<p>NO EFFECT:</p> <p>Fort Monroe is entirely within the 100-year floodplain. The proposed action would not require any land disturbance.</p> <p>In the proposed concentration and under strict adherence to the label requirements, pesticides used in aerial spraying would not have significant impact on water quality. The naled used for adult mosquito control is nearly insoluble in water, and under normal circumstances, most of the applied naled (and its major decomposition products) would be degraded within 24 hours of application. Naled would be applied at such a low rate that the potential for runoff to unintentional areas is small. The B.t.i used for larval mosquito control is a naturally occurring pathogen that biodegrades readily. Glyphosate dissolves in water easily and tends to adhere to sediments when released to water. Microbes in the soil readily and completely degrade it even under low temperature conditions.</p>
<p>Point Source Pollution Control</p> <p>The point source program is administered by the State Water Control Board pursuant to Code of Virginia § 62.1-44.15. Point source pollution control is accomplished through the implementation of the National Pollutant Discharge Elimination System permit program established pursuant to Section 402 of the federal Clean Water Act and administered in Virginia as the Virginia Pollutant Discharge Elimination System permit program.</p>	<p>NO EFFECT:</p> <p>The proposed action does not include point source pollution to any surface water body.</p>

<p>Coastal Lands Management</p> <p>This program is a state-local cooperative program administered by the Chesapeake Bay Local Assistance Department and 84 localities in Tidewater, Virginia established pursuant to the Chesapeake Bay Preservation Act (CBPA); Code of Virginia § 10.1-2100 thru § 10.1-2114 and Chesapeake Bay Preservation Area Designation and Management Regulations; and Virginia Administrative Code 9 VAC 10-20-10 et seq.</p> <p>The CBPA was passed in 1988 to protect environmentally sensitive lands that lie alongside or near the shoreline of streams, rivers, and other waterways. The CBPA provides a level of protection for resource lands along streams and open water by requiring the local designation of Resource Protection Areas (RPAs) and Resource Management Areas (RMAs). RPAs include tidal wetlands and certain nontidal wetlands. RMAs include land types landward of RPAs that, if improperly used or developed, have a potential for causing significant water quality degradation or for diminishing the functional value of the RPA.</p>	<p>NO EFFECT:</p> <p>The project areas include RPAs and RMAs. In the proposed concentration and under strict adherence to the label requirements, the pesticides used in aerial spraying would not have significant impact on the Chesapeake Bay watershed.</p>
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Other Environmental Issues

1. **Hazardous Materials and Hazardous Waste Management.**
With implementation of the IPMP, there is expected to be an overall decrease in the use of chemical pesticides and, therefore, a decrease in hazardous materials/wastes at Fort Monroe.
2. **Cultural Resources.**
Fort Monroe is a National Historic Landmark (NHL) and is listed on the National Register of Historic Places. The proposed action does not impact any architectural, archeological or traditional cultural resources at Fort Monroe.
3. **Human Health and Safety**
Chemical pesticides pose a safety risk to the handlers, but these concerns are minimized by use of appropriate personal protective equipment, training in proper pest control techniques, and adherence to all precautions on the pesticide labels and associated Material Safety Data Sheets (MSDSs). The aerial spraying of naled could concern populations in the spray areas. The EPA estimated the exposure and risks to both adults and children posed by the ultra low volume aerial and ground applications of naled. Because of the very small amount of active ingredient released per acre of land surface, the estimates found that for all scenarios considered, exposures were hundreds or even thousands of times below an amount that might pose a health concern. Nonetheless, measures would be taken to protect the public by notifying identified sensitive individuals prior to application. The public would be notified, by print and electronic media, with sufficient time to allow for planning to minimize exposure during pesticide application.
4. **Noise**
Aircraft flights associated with aerial spraying would cause noise impacts, but the flights would be infrequent and of short duration.

5. Geology and Soils

The proposed action would have no effect on the geology, and there would be only minor and limited impact to soils due to spraying of chemical pesticides.

6. Socioeconomics and Environmental Justice

There are no low-income or minority communities within the area of the proposed action, so no individuals would experience a disproportionate health, safety, or environmental impact.

Based upon the provided information, data, and analysis, Fort Monroe finds the implementation of the IPMP at Fort Monroe is consistent to the maximum extent practicable with the enforceable policies of the Virginia Coastal Resources Management Program.

[The Environmental Assessment of the Integrated Pest Management Plan for Fort Monroe, Virginia, is incorporated by reference into this Consistency Determination. It provides the information, data and analyses supporting the determination of consistency with the applicable enforceable policies].

Pursuant to 15 CFR Section 930.41, the Virginia Coastal Resources Management Program has 60 days from the receipt of this letter in which to concur with or object to this Consistency Determination, or to request an extension under 15 CFR section 930.41(b). Virginia's concurrence will be presumed if its response is not received by Fort Monroe on the 60th day from receipt of this determination. The Commonwealth's response should be sent to:

Jennifer Guerrero,
Directorate of Public Works and Logistics
318 Cornog Lane
Fort Monroe, VA 23651-1110,
(757) 788-5363 (phone)
(757) 788-2841 (fax)
guerrerj@monroe.army.mil (email)

APPENDIX F: AGENCY CORRESPONDENCE

